

January, 1899.

Historical Society

Vol. 25. No. 1.
Whole No. 1018.

THE
INDUSTRIALIST.

Issued 10 times per year by the
KANSAS STATE AGRICULTURAL COLLEGE.

Established,
1875.



A
Magazine
for the
Promotion
of
Agricultural,
Industrial
and
Civic
Education.



Single
Copy,
10 Cents.

EDITED BY THE FACULTY.

Managing Editor, - - PRES. THOS. E. WILL.
Local Editor, - - - PROF. J. D. WALTERS.

PUBLISHED BY

THE PRINTING DEPARTMENT,
CHAS. S. DAVIS, Supt.

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Entered at the Postoffice at Manhattan, Kansas, for transmission as second-class matter.

Subscription Price

One Year,	-	-	-	-	-	\$1.00
Special Club Rate to Students and Alumni	-	-	-	-	-	.50



Manhattan, Kansas: College Type and Press.
CHICAGO ADDRESS: 77 CLARK STREET, ROOM 23.

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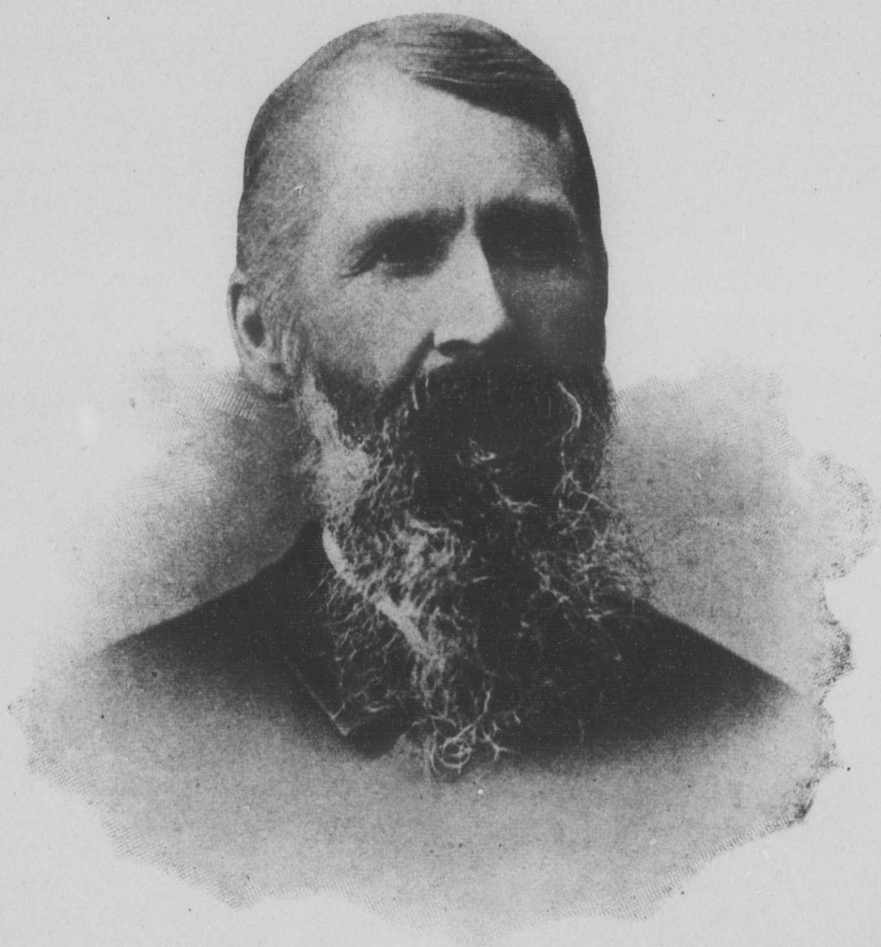
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JAMES HERVEY LEE, A. M.

THE INDUSTRIALIST.

Manhattan, Kansas.

Vol. 25, No. 1.

January, 1899.

Whole No. 1018

MUNICIPAL LIBERTY.

BY FRANK PARSONS.

LIBERTY implies self-government. One who is governed by others entirely possesses no freedom at all, and one who is governed by others in part has only a partial freedom.

Free institutions are institutions that embody the principle of self-government, and the freest institutions are those that carry self-government nearest to perfection, reducing to a minimum all external control.

Justice, no less than liberty, calls for self-government. History shows that whenever one man or a group of men have power over others without responsibility to them injustice is sure to result. So long as human nature is selfish the controlling wills are certain to pervert their power to their private uses to a greater or less degree, and even were this injustice eliminated there would still remain the equal wrong of depriving the people of the elevating and educating effects of managing their own affairs. There is no way in which the affairs of any group of people can be managed in the interests of those people, except to make those people themselves the final judges of what their interests are, and how they shall be administered.

Self-government then is the substance of liberty, and the foundation of justice: it is therefore the basic idea of our institutional jurisprudence, whose objects are justice and liberty. So fundamental is this principle in our law that it is held, by high authority, to be inherent in our system of government, underlying and permeating our constitutions, and rendering void all legislation in conflict with it, even tho such legislation may not be objectionable in the light of any express provision of the constitution under which it is enacted. Such is the doctrine of Judge Cooley in *People v. Detroit*, 28 Mich. 228 (1873). See also *People v. Hurlbut*, 24 Mich. 44 (1871). Similar views are expressed in *State v. Denny*, 118 Ind. 382 (1888); and *Evansville v. State*, 118 Ind. 426 (1888).

THE PRINCIPLE OF SELF-GOVERNMENT NOT THOROLY APPLIED.

But while it is clear that free institutions must be founded on self-government, and our constitutions, statutes and theories of govern-

ment are saturated with the idea, yet the law does not apply the principle consistently thruout: in four respects at least the application is defective.

1. As to *areas*. The law recognizes the right of self-government in respect to state and nation, but not in respect to cities. Municipal corporations are creatures of the legislature. They have only such powers as may be given to them by the legislature, which may, at its pleasure, abridge or annul their powers and privileges, divide them or consolidate two or more of them into one without their consent, attach a condition to their continued existence, or abolish them completely. For authorities on these points see, 102 U. S. 472, 511; 93 U. S. 266; 4 Wheat. 518; 74. N. Y. 161, 166; and Judge Dillon's book on the law of "Municipal Corporations," §§ 54, 64, 85, 89.

2. As to *classes*. The law recognizes the principle of self-government in a general way in respect to men, but not in respect to women. State and nation are masculine nouns, as yet, in the bulk of our law. The law does not pretend to provide a government of the people by the people, but only a government of the people by the men. Something has been done toward emancipating our male citizens, but women and cities are still awaiting emancipation. There are legal grounds, you will observe, for the custom of calling a city "she."

3. As to *departments of life*. Our law declares emphatically for self-government in political life, but makes no effort to apply it to industrial life. Workingmen, as a rule, have no vote in determining the policy and management of the railroad, farm, factory, store, etc., to which they belong, or in connection with which they labor. There is no democracy in industry. Imperial capital rules there alone. Yet a man has just as much right to a voice in the management of the industrial group to which he belongs as he has to a voice in the management of the political group to which he belongs, and it is just as necessary for liberty, justice and development that the principle of self-government should be applied to the mine and the factory as that it should be applied to state and nation. It would not be just, however, to let the workmen determine the management of a mine or factory till they, in some fair way, become the owners of the property. Control is the essence of ownership, and to let the workers control the affairs of the factory or other business enterprise, before it was theirs by gift or purchase, or other lawful process, would simply amount to confiscation. For the sake of justice,

and the manhood that comes with responsibility and opportunity, the principle of self-government should be applied to industrial life; but public ownership, or some other form of coöperative ownership, must precede such application in order that it may be just.

4. As to *methods*. The principle of self-government, even when applied, is generally very imperfectly carried out. We have not even political government by the men to any considerable extent.

In cities, we have government by councils.

In states, we have government by legislatures.

In the nation, we have government by congress.

The people have little direct efficient control. They are sovereign *de jure*, but not *de facto*, except at election time. The actual power exercised by the people consists chiefly in the periodic choice of a new set of masters, who can make laws to suit themselves, and enforce them till their term is up regardless of the will of the people. We call our legislators agents, but it is a queer agent who can sell or give away my property against my wish and protest, a queer agent who can refuse to manage my business in the way I ask him to, and who can violate my orders and disregard my instructions, and still be safe from discharge till the term for which I employed him to act for me has expired. You engage an architect to draw plans for your house, but you expect to have the plans submitted to you before your money is spent in building. You hire a cook to prepare your food, but if the soup she makes does not seem good to you, the agency does not confer the right to compel you to swallow it. Legislatures are not agents, but masters, and the people do not, for the most part govern themselves, but merely select the persons who are to govern them. These legislative masters have many interests in common with the rest of the people and not infrequently wish to be reëlected, so that they act to a considerable extent as real agents would. But they are not real agents for they are not bound to act for the principal's interest or according to his instructions, and every now and then when their interests are strongly opposed to the people's, and they think they can act in such a way as not to arouse public indignation, or they have a political machine at their backs assuring reëlection whatever they do, or the interest involved is more important to them than the chance of reëlection—then they give away franchises, lease city gas works, make bad contracts, pass laws for their private benefit, and act in public affairs in many a way they would never dream of acting if the business in their charge had

been intrusted to them by an individual or company employing them as agents subject to the principal's supervision, instruction, veto and discharge according to the universally recognized principles of the law of agency. A man who can give away my property against my protest, and without redress and can make laws that I have to obey for a year or two or four years till he goes out of office, is not my agent, but my master for the term.

WHAT THE PRINCIPLE OF SELF-GOVERNMENT REQUIRES.

Anything like a complete application of the principle of self-government would require:

1. The initiative and referendum so that the people could veto legislation they disliked, and bring to discussion and vote any measure they wish to have promptly acted upon. Thus only can our legislators be made real agents instead of masters, and the sovereignty of the people become actual and effective instead of being theoretic and potential merely.

2. Public ownership of monopolies and coöperative association in other fields, so that liberty, justice and self-government may obtain their rightful jurisdiction over industry.

3. Suffrage for women. It may or may not be best in any particular state to give women the ballot before they demand it with reasonable force and unanimity—that is perhaps a debatable question—but it seems beyond doubt that liberty, justice and self-government will not be complete until women may vote on the same essential conditions as men. The full expression of the principle of self-government makes no distinction of sex, any more than of color, form, or occupation, but gives the right for justice and development on equal terms to all who possess the requisite interest and capacity; citizenship, good character, full age and discretion, plus a certain degree of education, being the sole requirements generally found in the law when the non-essential element of sex is omitted from the list, and (with the possible tho doubtful expression of a property qualification for a vote in certain cases) they constitute the sole requirements that can be regarded as having essential relations with either the need or the capacity of self-government.

4. Home rule for cities in respect to internal business affairs.

All these reforms and others are required to secure full liberty in municipal life, but freedom of the municipality from legislative interference in local business is an element to which the words "Municipi-

pal Liberty" apply with peculiar force and appropriateness, and it is of this element that I wish to speak with special emphasis.

A city ought to be as free and independent in its sphere as states and nations are in theirs. A state has no more right to impose its judgment on a city in respect to the city's internal business than the nation has to impose its judgment on a state in regard to the internal business of the state. The true rule is that national interests should be governed by the nation, the state's peculiar interests by the state, the city's special interests by the city, and the individual's personal interests by himself; and the presumption is always with the lower group and the principle of decentralization. Individual liberty should be left as large as possible, personal freedom being curtailed only where the public good clearly requires it. The field of public action as much as possible should be left to the cities and towns, no business being given to state control except such as the clear interests of the state require to be so placed; and lastly no powers should be exercised by the national government except such as are necessary for purposes and interests of national moment.

In this way knowledge, interest, personal contact, and opportunity for efficient watch and control will be united in the highest degree with the natural justice that accords to each man, and each group of men, the right to govern those affairs that peculiarly pertain to such individual or group. Whether a man shall eat pumpkin or cherry pie for his dinner is a matter in which *his* interest so transcends the interest of others that he is left free to do as he likes. Whether Detroit shall own and operate her street railways, or sell electric light to private consumers, or put in a municipal telephone, are matters in respect to which the interest of her citizens transcends the interests of the citizens of Coldwater, Lansing, Grand Rapids, Mackinaw City, Cascade Junction, Stevensburg, Eagle Harbor, and all the other fourteen hundred towns and cities in the state, to such a degree that her citizens should be left to make the decision for themselves, and not be compelled to submit the question to a lot of representatives from all over the state, most of whom know nothing of the actual facts in the problems of Detroit. Detroit and Grand Rapids should not decide whether or not Mackinaw City shall have a public telephone, or municipal street railway, or water-works, and Mackinaw should not decide such questions for Grand Rapids or Detroit. Each city should be free to attend to its own internal business, in its own way, subject only to general con-

stitutional provisions intended to guard private rights against unjust infringement, and secure control to the *citizens*, so that the actual power of decision may rest with the people, whenever they are fit to exercise it, and not with aldermen and councils beyond the immediate control of the people.

THE SUBJECTION OF CITIES.

How far this is from the ordinary condition of things at present, the following facts will show:

1. A municipality has no initiative of its own. It must have permission from the legislature for everything it does. If it learns of the great success of Glasgow with her public tramways, and wishes to try the same plan with its own roads, it must first convince the representatives of the farming and mining districts, and get the consent of the corporation lawyers from the many cities of the state.

The Brooklyn Bridge, owned by New York and Brooklyn, cost fifteen millions of dollars. The charge made on the public cars across the bridge was $2\frac{1}{2}$ cents a passenger—foot passengers free. The St. Louis bridge was built by private enterprise. The bridge proper cost ten million and was bought for considerably less than this by the Goulds, yet the ordinary Gould charge for crossing it is 25 cents per passenger in the cars, and 5 cents per foot passenger, and on some of the railroads, it is said, the bridge charge rises to 75 cents per passenger. If a city in need of a bridge, and knowing these facts, prefers a public bridge, it must go and lobby a bill thru the legislature against the money and influence of the syndicates of capitalists who prefer to build the bridge themselves.

Till 1894, the federal government paid the Bell Telephone Company \$75 per year per 'phone for the Washington service. The government then asked for a reduction which, being refused by the Bell, the department of the interior bought telephones and put in a system of its own connecting the widely scattered buildings. The total cost of this public system, operating expenses, repairs, interest, taxes and depreciation—everything a private company would figure on—is \$10.25 per 'phone per year, instead of \$75 per 'phone per year as under private ownership. In a western town of about 3000 inhabitants, there is a telephone system with 250 subscribers, which pays 25 per cent on the investment after subtracting all operating expenses, and allowing 7 per cent for depreciation, and yet the charges are only

\$1 a month for a residence, and \$2 a month for a business 'phone. If a city or town, in view of such facts, desires to take effective measures to prevent the continuance of extortionate telephone charges—\$36, \$48, \$75, \$100, \$150, sometimes \$240—it cannot move hand or foot without the consent of the rest of the state.

Suppose Mrs. B desired to use rugs in place of carpets, or put in Welsbach burners in place of incandescents, or make any other change in her housekeeping, or the internal arrangements of her home, and she were not permitted to act without first consulting sister D and sister R and sister M, and all the other women in the city, and obtaining their consent. Were this required there would be a revolution by the side of which 1776 would grow pale. And why don't the cities rebel? Because, I presume, municipalities have milder dispositions than their individual sisters; and then they have never experienced their rights, never enjoyed their liberty. They have been brought up with the apron string around them, trained to the habit of getting permission from other municipalities before they make any change in their housekeeping, taught that their very existence is by sufferance of the legislature, and they have come to think these arrangements a natural part of the universe.

2. A second proof of municipal infancy is the fact that the legislature may compel a city or town to pay a claim made against it, altho such claim may have been denied by the courts, and has no foundation in law or justice.

In a New York case, C sued on a claim clear thru the court of last resort but was beaten. The legislature passed an act submitting the question to the voters of the town, and declaring that their decision should be final and conclusive. The citizens voted against the claim. Then the legislature ordered the town to pay, and the order was held good in 13 N. Y. 143, Judge Denio saying:

The statute book is full, perhaps too full, of laws awarding damages and compensation of various kinds to be paid by the public to individuals who had failed to obtain what they considered equitably due them. . . . The courts have no power to supervise, or review the doings of legislatures in such cases.

The ground of decision is that the municipality is the creature of the legislature. If an act were passed requiring Mr. Smith to pay Mr. Jones the amount of a claim made by Jones on Smith, which had been tried in the courts and rejected, or if the legislature should order the Pennsylvania Railroad Company, or Adams Express Company, to pay a claim the courts had overruled, there is no doubt the

act would be held unconstitutional as taking private property without due process of law. Even in the case of the infant municipality, it is probable that if it were clear on the facts before the court that the claim was unjust and without even the slightest symptom of a possible moral foundation, the legislative order might be held void as taxation for private purposes (see 64 N. Y. 92, 99); but, in the region of doubt, between claims enforceable in the courts, and claims that are clearly unjust on the face of the facts, the legislature may arbitrarily order a municipality to pay, altho a similar order directed against a single individual, or an association of individuals constituting a private corporation, would be held unconstitutional and void.

3. The legislature has such power over municipalities that it can plan and construct the public buildings of a city without reference to the wishes of the citizens, and then compel them to pay for the work. In 1870, the legislature of Pennsylvania arrived at the conclusion that Philadelphia should have a new city hall, so it passed an act to that effect, naming certain gentlemen as commissioners to erect the building, with absolute power to create debts for that purpose, and require the levy of taxes on the city for their payment. The act was held constitutional (*Perkins v. Slack*, 86 Pa. 270); and, for about a quarter of a century the people of Philadelphia have been paying enormous sums, millions more than the buildings were fairly worth, for work they did not authorize and over which they had no control, altho it consisted simply of the construction of municipal buildings for their own city—a remarkable example of the intense paternalism, to use the mildest word that suggests itself, to which the law subjects municipalities. It would be deemed a very strange thing for the legislature to say to an individual citizen:

Mr. Johnson, your old brick house is getting a trifle small for you and your servants, and isn't very handsome anyway; you are able to build a palatial marble dwelling, and I guess we'd better have it done. I'll plan the thing and see it constructed to suit my taste, and you can pay for it; as you are the one who will have to live in it.

The courts would not allow the legislature to act in this way towards a single individual, but a million individuals who constitute a city must be left, in such a case, entirely at the legislative mercy.

4. It has even been held that the legislature may take city water-works or other public works out of the hands of the city, entirely, and give the management of them to state officers chosen by the legislature, or appointed by the governor (7 *Houston* [Del.] 44, 44 *Ohio* 348, etc.) Some courts hold otherwise as we shall see.

TOPEKA ELECTRIC LIGHT PLANT.*

BY HENRY M. THOMAS.

IT is a peculiar fact, that altho Topeka has one of the oldest municipal electric lighting plants in the United States, yet among the many descriptive and analytical articles that have been written on the problems of municipal ownership of electric lighting plants, few and rather vague references only have been made to this plant; and almost no deductions, either for or against public ownership, have been drawn from its history. To bring the plant from its obscurity and to make available the lessons which its history has for students of municipal problems, was the object of the writer's investigations.

At the time when the subject of street lighting was under the consideration of the citizens of Topeka, the problem of private versus public ownership seems to have been very quietly and easily disposed of. The officials of Topeka found upon investigation, that the municipality of Bay City, Michigan, whose population, area, and other conditions were similar to those of Topeka, was operating its own street lighting system at a cost to the city of from \$6.00 to \$7.00 per arc light per month, while the cheapest bid Topeka was able to secure from a private company or corporation was \$10.00 per arc light per month. Some further investigations were made, but with the final result that the city was confronted with the plain business proposition of either paying \$10.00 per light per month to a private corporation, or of establishing and operating a city plant, which, if managed upon ordinary business principles, promised to provide street lights at a rate much below this. Under these conditions but one reasonable course was open, i. e., city ownership and operation, which was the plan adopted.

THE PLANT ESTABLISHED.

The plant was established in the year 1887, when the use of electricity for illuminating purposes was in a somewhat chaotic stage of experimentation; at that time authorities and experts differed widely as to the relative merits of the low- and high-tension systems of lighting. When we consider these circumstances, there is no occasion

* This paper was prepared by Lieutenant Thomas as part of his work as a special student of economics at the College last year. A large portion of it appears in the Thirteenth Annual Report of the Kansas Bureau of Labor and Industrial Statistics. — E. W. BEMIS.

for attaching blame to the city's representatives who selected and purchased a low-tension equipment, altho it has since been conclusively demonstrated that this system is the less practical and efficient of the two, and at the present time is entirely obsolete.

The site secured for the plant was that of a former brewery, 60 by 90 feet, and four lots at the east side of the city, near the Santa Fe depot, which were purchased together at a total cost of \$8,559.33. The location of the plant is not, at the present time, as convenient as could be desired, nor as convenient as it was at the time of its purchase, for the subsequent growth and development of the city has been largely toward the south and west, away from the station, thus leaving the works at one side of the city instead of near the center, which is the more desirable location.

The original equipment, which unfortunately proved to be inefficient and unsatisfactory, consisted of three boilers,* of 75 horsepower each, and three Ball automatic, high-speed engines, which were together worked to 235 horse-power; six Jenny Indianapolis arc dynamos of 30 lamp-power each; six circuits with 24.72 miles of line; and 42 miles of wire supported on 943 30-foot poles. The lamps are suspended between 40-foot poles at the center of each intersection on the principal streets, and at each alternate intersection on the residence streets. The greater portion of the lamps are 1100 feet apart one way and 800 feet the other; making in all, 184 lamps, rated at 2000 candle-power each. A test of 17 lamps showed an average pressure of 23.15 volts, and a current of 19 amperes 43.85 watts or 1953 nominal candle-power.

This equipment was put in for the city under a contract, which fact makes it impossible to secure an itemized statement of original cost. The total original cost for plant, poles, and wire was \$46,888.65, which, added to the cost of building and site given before, makes the total cost of the entire system, ready for operation, \$55,447.98.

THE PLANT NOT ECONOMICAL.

A provision in the contract between the city and the manufacturers of the dynamos required that the cost per arc light to the city should not exceed \$6.00 per month, for the two years following the establishment of the plant, during which time the company should furnish a man to take charge of and superintend the plant. The first superintendent, Mr. Riley, not being satisfactory to the com-

* Another boiler of the same capacity was added to the plant in April, 1895, at a cost of \$1075

pany, was replaced by Mr. Morrell, who, altho a very capable man, was unable to keep the cost per lamp down to \$6.00 per month; consequently, at the end of two years the company had to pay the city a forfeit reported to the writer at between \$2,000 and \$3,000.

CITY ASSUMES CONTROL.

The city now assumed direct control and management of the plant, but retained the company's superintendent until November, 1890, at which time Mr. J. B. Marshall, the present superintendent, was appointed.

From November, 1889, to December, 1892, the maximum number of nights run during the month was 30, the minimum, 16, the average, 25.25; the maximum average number of hours per night was 12.88, the minimum, 5.07; the maximum cost per lamp per month was \$10.59, the minimum, \$6.43, the average, \$7.75. The cost of coal, which averaged \$2.75 per ton, was 25.67% of the total expense; carbons, 5.51%; globes, 0.43%; oil and waste, 1.18%; repairs, 8.93%; expenses of insurance and telephone, 2.45%. salaries and wages, 36.70%; and interest on cost of plant at 6%, 19.43%.

Owing to the fact that the plant, when run to its utmost capacity, could not furnish a sufficient number of lights for illuminating the entire city, a private company was induced to supply 74 vapor lamps, located at various places in the suburbs, at a cost to the city of about \$5,000 per year, beginning in the year 1891 and continuing until June, 1896.

THE PLANT REBUILT.

During the month of May, 1896, the plant was rebuilt—again under a contract. The necessity for rebuilding arose, not because the machinery was worn out, or had very materially depreciated in value, but from the fact that the low tension system was found to be exceedingly wasteful and expensive. The six Jenny low-tension dynamos and all the street lamps were exchanged for three 100-light Wood constant current dynamos, 258 lamps, and 14½ miles of additional line, at a cost of \$13,772.00, making the total cost of the plant, exclusive of lots and building, \$60,660.85. At this time the capacity of the plant was sufficiently increased to enable the city to dispense with the costly vapor lamps, by replacing them with arc lights; sufficient wire was also secured to use for all the extensions since made. All of these extensions have been made by the regular force, with no cost to the city additional to their regular wages.

OPERATING EXPENSES.

The operating expenses officially reported for the year, from June 1, 1897, to May 31, 1898, were as follows:

Coal, mainly slack, at \$2 per short ton.....	\$3,195 73
Carbons	1,093 83
Oils	58 64
Waste	29 48
Globes.....	51 50
Insurance.....	282 00
Telephone.....	50 00
Horse feed, shoeing.....	83 75
Labor.....	5,499 96
Incidental expenses	606 05
Total.....	\$10,950 94
Operating Expenses per light per year of 2195 hours (264 lights).....	41 48

WAGES.

Seven men are employed by the month. The engineer receives \$75 per month; fireman, \$50; head trimmer and lineman, \$60 and a horse and cart; three other trimmers, each \$50, but they must furnish their own horses and carts; helper, \$40. The superintendent receives a salary of \$1000 per year.

EFFICIENCY.

The number of hours run, 2195, is not large in comparison with that of other cities of similar importance, in fact it is much nearer the minimum than the maximum record. This can be accounted for by the fact that the moonlight schedule, as governed by the condition of the weather, is followed; and also on the ground that absolutely no lighting is done except in the streets. However, in a comparison with plants in other cities whose hours do not vary widely from the record of the Topeka plant, there is established the fact that, in proportion to the hours run, the Topeka plant exhibits a record for economy of operation that is very creditable.

In a comparison with plants in other cities, the Topeka establishment is severely handicapped by the enormous amount of capital which has been invested in it, and on which interest, depreciation, and taxes must be allowed. The plant, having been established when electric lighting was in its infancy, is now heavily burdened with the cost of new and modern equipments, with which, in the rapid development of electrical science, it has been found advisable, as a measure of economy, to replace the original equipment, before that had been worn sufficiently to be unserviceable.

In the writer's judgment, under these circumstances, the most reasonable capital to use as a basis for calculation is the original cost

of the plant, less the amount refunded to the city by the company at the end of the first two years of operation. This amount is given as between \$2,000 and \$3,000, while the original cost was \$55,447.98; for these calculations the capital has been taken as approximately \$53,000.

In order that the record of the plant may be compared with that of privately owned plants as regards the cost of operation, the following table has been prepared, in which 5% has been allowed for depreciation, three-fourths of 1% for taxes, and 5% for interest. These percentages are reckoned upon \$53,000 for 1890, and for the next year upon this amount after the depreciation of the preceding year has been deducted, and similarly for 1892, altho the plant was constructed in 1887 and was run on trial by the construction company until Nov. 1, 1889.

DATE.	Operating expenses.	Op. exp. per arc.	Assumed value of plant Jan. 1.	Int. & dep. per arc.	Taxes @ $\frac{3}{4}$ per cent per arc.	Total fixed charges.	Total cost.
1890.....	\$13,765 33	\$74 27	\$53,000 00	\$28 80	\$2 16	\$30 96	\$105 23
1891.....	12,333 84	67 03	50,350 00	27 36	2 05	29 41	96 44
1892.....	13,867 55	75 37	47,832 50	26 00	1 95	27 95	103 32

The average expense for the three years thus appears to have been \$72.22, without interest and depreciation, or \$101.66 with these items, or \$8.47 per month. The original capital, less depreciation reckoned at 5%, amounted, in June, 1896, to \$37,985.88, to which should be added \$13,772, the cost of rebuilding, making a total capital of \$51,757.88. The allowance of 5% for depreciation would reduce this to \$49,169.99, May 31, 1897, and to \$46,711.49, May 31, 1898. Interest, depreciation and taxes on \$49,169.99 at 10.75% for the year ending May 31, 1898, would be \$20.02 for each of the 264 arcs, while the operating expenses were \$41.68. The total was \$61.70 per arc per year, or \$5.14 per month.

That a sufficient amount has been allowed for depreciation is evident from the fact that the superintendent estimates that the plant can be duplicated for \$45,000, while a well-known electrical engineer estimates the cost of duplication at \$35,000, aside from land and buildings, which cost nearly \$10,000, more. These estimates were made in the spring of 1898, at which time the allowance of 5% a year for depreciation would have reduced the capital allowed above, to \$46,711, in case the depreciation be reckoned only from Jan. 1, 1890, but below \$44,000, if depreciation be

reckoned from the time, in 1887, when the construction company began to operate the plant.

In a comparison with privately owned plants under similar conditions as to operation in other cities, this is a showing that speaks exceedingly well for the Topeka plant, burdened as it has been with a poor plant at the start, and with the necessity, therefore, of allowing 5% depreciation ever since, in order to write off the unusual shrinkage in the value of the tangible assets.

Below is given a table of comparisons of the cost of operation of the Topeka plant, since it has been rebuilt, with privately owned plants in several other well-known cities. The prices here quoted are taken from Bulletin 4112, of Aug. 16, 1897, issued by the General Electric Company, Schnectady, New York.

LOCATION OF PLANT.	Pop.	No. of lamps.	C. P.	Schedule.	Hours per year.	Coal per ton.	Price per lamp per year.	Price on basis of coal at \$2 a ton.
Topeka, Kan.	40,000	258	2,000	Moonlight ...	2,146.55	\$2 00	\$61 70	\$61 70
Belleville, Ill.	19,000	138	2,000	" ..	2,179.00	65	80 00	89 45
Danville, Ill.	16,000	121	2,000	" ..	2,179.00	60	80 00	89 80
Burlington, Ia.	30,000	122	2,000	" ..	2,179.00	95	100 00	107 35
Keokuk, Ia.	18,200	141	2,000	" ..	2,179.00	1 85	83 33	84 38
Galesburg, Ill.	22,500	170	2,000	" ..	2,179.00	1 58	79 50	82 44
Quincy, Ill.	45,000	258	2,000	Philadelphia ..	2,250.00	1 00	75 00	82 00
Indianapolis, Ind.	185,000	1,100	2,000	Moonlight ...	2,179.00	1 25	85 00	90 25
Des Moines, Ia.	80,000	158	2,000	" ..	2,179.00	1 00	96 00	103 00
Newport, Ky.	50,000	108	2,000	" ..	2,179.00	1 00	100 00	107 00
Lincoln, Neb.	50,000	176	2,000	Midnight	1,825.00	1 90	96 00	96 70
Canton, O.	38,000	155	2,000	Moonlight ...	2,179.00	1 55	62 50	65 65
Columbus, O.	130,000	990	2,000	" ..	2,179.00	1 00	74 50	81 50
Youngstown, O.	43,000	349	2,000	" ..	2,179.00	1 35	64 00	68 55
Zanesville, O.	30,000	215	2,000	" ..	2,179.00	1 50	75 00	78 50

The cost in Topeka is thus seen to be less than in any other city whose lights burn about the same time.

Supt. D. Hunter of the Allegheny public plant estimates that for a run of 4000 hours, \$10 should be allowed for every extra dollar of cost of coal. However, for a 2000-hour run \$5 would manifestly be too low. As the run of each of the plants here referred to, with one exception, slightly exceeds 2000 hours, it is considered that an allowance of \$7 for every extra dollar of cost for coal is a reasonable approximation for them.

IMPROVEMENTS NEEDED.

While the efficiency and cost of operation of the plant, as shown by this investigation, are quite satisfactory in a comparison with cost and service in other cities, yet some immediate changes and improvements are extremely necessary in the equipment in order to make the service more efficient and to enlarge the scope of its usefulness,

as well as to bestow upon the taxpayers an agreeable reduction in the cost of operation.

In order to obtain the greatest economy in fuel, the automatic high-speed engines need to be replaced by engines of the Corliss type, and of greater power. By this means alone the superintendent estimates that there could be a constant saving in fuel of from 30% to 40% of the amount now used. This is no small item.

At present the engines and dynamos are run to their utmost capacity each night; nothing is in reserve to maintain the lights in case of accident, and on great occasions such as the Fall Festivals, the only way to give additional lights to the principal streets of the city is to cut off a like number of lamps in the suburbs. To supply this need for something in reserve, more power and larger dynamos should be secured.

INFLUENCE OF POLITICS.

The standing charge that political influence and jobbery does and will destroy the efficiency of every city-owned enterprise does not seem to be substantiated by the record of this plant. Altho the tenure of employment of the less-skilled workers is perhaps largely regulated by political considerations, yet the engineer and the chief linesman and trimmer, who is reputed to be especially expert, as well as the superintendent, have each had steady and permanent employment for a number of years, even thru different political administrations in the city. In fact, the present superintendent, who is a republican, was appointed by a mayor who was a democrat. It is true, however, that the absence of attempts on the part of political workers to secure the position of superintendent might be accounted for by the fact that his salary is so extremely low, \$1000 per year, as to offer few inducements for their efforts.

GENERAL OBSERVATIONS.

The plant, as conducted at present, is a credit to the municipality, and is the pride of the citizens. Thoro and extensive efforts to find some complaints or evidence of dissatisfaction with the plant were entirely futile. The citizens are a unit in their expressions of satisfaction with city ownership under a management as efficient as the present one.

In spite of the mistakes that have been made, city ownership and operation of the street lighting system has proved a paying investment to the municipality. As one result of the experience, it is not unreasonable to expect that in the future the city will exhibit great

capabilities of management, and will still further improve the service and reduce the expense. When the plant was founded, the lowest bid that had been received from a private company was for \$10 per light per month; and while there are no data beyond November, 1889, yet it is believed to be a near and safe approximation to assume that the cost per lamp did not exceed that for the 38 months immediately following the date just mentioned, for which time we have already presented exact statements of cost. According to the table given, the cost per lamp per month from November, 1889, to January, 1893, was \$8.40, which leaves a difference of \$1.60, per lamp per month in favor of city operation. The number of lamps at this time was 184, and on the assumption that the saving just mentioned was continuous from 1887, to 1893, there was a total saving to the city over what a contract for \$10 per light per month would have involved, of \$21,186.80. And had the same rate of economy been prolonged up to the time of the rebuilding of the plant, the amount retained to the city would have been the large sum of \$33,561.60. When the rebuilding of the plant was under contemplation the Edison Company endeavored to secure the street lighting by presenting a bid for the extremely low figure of \$6 per light, but even at this rate the city would have suffered a loss of 87 cents per light per month, amounting, for the year covered by this investigation, to \$2,693.52, in view of the economies effected by the new apparatus.

But aside from the matter of economy, there is also the additional and important factor of freedom from restraint—of independence—which the city now enjoys. Had the city accepted the original ten-dollar contract instead of establishing the plant itself, it is altogether probable that the franchise would have been granted for a period of at least ten years, in which case the city not only could not have saved the sum of about \$19.20 per lamp per year for ten years, but it would also have had no opportunity, until the franchise expired, to improve the service and reduce the expense by rebuilding.

Strange as it may seem, the subject of extending the usefulness of the plant by applying it to commercial lighting has never been agitated, and meets with little approval among the citizens. They prefer to pay direct taxes to support the plant, rather than to have the city enter into competition with private companies, even tho by so doing the profits derived could be applied to the maintenance of the plant and thus result in a reduction of their taxes or be applied to a reduction of commercial charges.

THE PREVENTION OF BLACKLEG IN CATTLE.

BY PAUL FISCHER.

IN presenting a brief paper on the subject of Blackleg prevention, it is desired to discuss the principal active causes of the disease and to deduce therefrom some practical suggestions as to the best methods of combating it.

Blackleg is an infectious disease that confines its ravages to certain restricted areas. Its direct cause is an anaerobic motile bacillus with distinctly rounded ends, more or less club- or spindle-shape in form and frequently containing spores. In blackleg victims this bacillus is found principally in the emphysematous tumors of the affected muscles and subcutaneous connective tissue, in the hepatic secretions, and sparingly in other parts of the body. The blood itself does not contain the bacilli until some time after death.

The blackleg bacillus, or clostridium, is a facultative parasite and hence thrives under certain conditions outside of the animal body, in the soil. A damp soil, rich in humus, seems best adapted to its growth and preservation. The warmer seasons of the year, spring, summer, and autumn, but especially the latter, when the upper layers of the ground are dried out and the ground water stands low, show the greatest number of outbreaks of blackleg. Just why this should be so can not at present, perhaps, be fully explained. It seems however to be a fact based on abundant careful observations and is in harmony with observations made regarding other infectious diseases that have an endemic character.

Blackleg attacks principally young cattle in good flesh, occasionally sheep and goats. Guinea pigs can be artificially inoculated, and in horses, asses, white rats and a few other animals local lesions only can be produced. Pigs, dogs, cats, and man are immune, or at least practically so. I have observed one case in a pig.

Among cattle, animals in good flesh and between the ages of six months and four years are most susceptible, but cases have come under my notice where the victims were much under six months of age, and once a fatal case in a calf ten weeks old was observed (July 25, 1898).

Why younger animals are not affected is stated by Arloing to be due to the animal nature of their food. The fact that older animals

are not affected can be explained by assuming that they experienced a light but unobserved attack while young and thus became immune against a second attack. In support of this theory it might be stated that older animals that were raised in districts free from blackleg, when brought into blackleg areas suffer just as younger animals do.

Blackleg is a wound-infection disease—being caused, invariably, by the entrance of the bacilli into the subcutaneous or submucous tissue thru fresh wounds. These wounds may be in the skin or in the mucous membranes of the respiratory tract or alimentary canal. Infection no doubt takes place most frequently thru the alimentary canal; wounds in this apparatus being easily produced by rough food, and besides, it is well known that the contents of the alimentary canal of blackleg victims often contain the bacilli in large numbers.

From a sanitary point it might be mentioned that the blackleg clostridium, or rather its spores, are exceedingly tenacious of life, that they can withstand exposure to the boiling water temperature for hours, and can successfully resist the destructive action of most disinfectants of the strength employed for ordinary disinfecting purposes.

The buried cadavers of blackleg victims will retain active spores for at least six months, and probably for a longer time. By this means new blackleg areas, even tho they may be temporary only, are constantly being created. The most important sanitary measure, therefore, would be to insist on the destruction, by burning, of all blackleg carcasses, on the spot where the victim died, and within twenty-four hours of the time of death. Even during this short time abundant opportunities would be given buzzards, crows, and other carrion feeders to scatter infected material and thus aid in spreading the disease. Dead animals should be burned on the spot where they died, because careless transportation, and we must always reckon with this, would simply be another factor in aiding dissemination of the infectious principle.

It is unnecessary, in this place, to discuss the symptoms of this disease, beside stating that it is characterized by its noncontagiousness, its rapid and usually fatal course, death nearly always setting in from $1\frac{1}{2}$ to 3 days after the appearance of the first symptoms.

This rapid course, in addition to the fact that no practical therapeutic remedies are known to us, gives the subject of prevention a

special interest. The cheapest and most effective way to prevent any disease, when we know its cause, is to protect susceptible animals from exposure to it. Effective as this procedure would be it is not always practicable.

It would entail the necessity of discarding from pasture purposes large tracts of grass lands that are useless for any other purpose. In more densely populated countries cultivation of such soils, stirring the particles of earth, pulverizing them and successively exposing them to the disinfecting influence of the sun's rays and permitting the oxygen of the air to circulate thru the loosened particles, is a very rational method of procedure, but it is impracticable on the grazing lands of our western states.

In case of most diseases, a vigorous constitution is in itself a great protection. In blackleg, however, we unfortunately come face to face with an enemy where a vigorous constitution is apparently a direct disadvantage.

Another means of guarding against disease is to gradually accustom or inure the body tissues to the disease-producing influences. We could mention many natural instances of this kind. Yellow fever in human beings and Texas or splenic fever in cattle are the best-known examples. Blackleg could no doubt be placed with these diseases, altho the animal tissues are not in all cases so successfully inured. But it is known that cattle from districts free from blackleg, when brought to infected regions always suffer greater losses in numbers than do native cattle. Still, this would not, at the present time at least, solve the question of prevention.

It is known that blackleg is a wound-infection disease and that infection can take place thru wounds only—hence the prevention of these wounds, which would necessarily have a limited application, would serve to lessen the number of cases. Having *clean* ranches, and, in case of stable feeding, the use of carefully prepared food, would be factors worth considering. The influence of barbwire fences I will not discuss now.

A last resort is preventive inoculation.

Preventive inoculation for infectious diseases is nothing new. At the close of the last century Jenner brought into general use vaccination with cowpox to protect against smallpox in human beings. The Chinese seem to have practised protective inoculation against this disease for more than a thousand years before the Christian Era.

On what principles does the practise of protective inoculation rest? In case of a great many infectious diseases it has been noticed that when animals have once recovered from an attack they can successfully resist a second attack. In other words, they are immune. Whether the disease from which the animal recovered was of a severe or a mild type, the immunity produced remains the same, and continues for the same length of time, weeks, months, years, or a life time, depending on the disease in question. In some cases a successful recovery from a mild disease will protect against another severe but related disease, as seems to be the case with cowpox and smallpox; an attack of the former protecting against an invasion by the latter.

To discuss and determine the cause of the resulting immunity, whether it is explained by the so-called exhaustion theory of Pasteur and Klebs, or the so-called hypothesis of retention whose principal champion was Chauveau, and not to mention the fantastic phagocytic theory of Metschnikoff, our limited space forbids.

We know that many infectious diseases attack most individuals of a susceptible species but once, the animal being immune thereafter for a longer or shorter period, and that it is immaterial whether the attack was severe or extremely mild. We also know that in exceptional cases animals of this kind may be attacked twice by the same disease, the second time even more severely than the first. Besides smallpox, cowpox and sheeppox, footrot in sheep, foot and mouth disease, pleuropneumonia, anthrax, swine plague, the disease known in England as red soldier, and others, blackleg may be mentioned in this connection.

An animal that has once recovered from an attack of blackleg possesses an immunity against further attacks for a certain length of time, whether the first attack was severe or mild. Whether it was due to a natural infection or to an artificial inoculation, the result remains the same, the animal is made immune for a period of time varying, no doubt, with each individual, but estimated from numerous reliable experiments to be about one year.

Animals treated in this way can safely be turned on infected pastures.

Acquired immunity can be brought about in various ways. The fundamental principle in each case, however, consists in the production of a mild form of the disease by means of inoculation, or vaccination as we may call it here, with an attenuated culture of the

disease-producing germ in question. Attenuation may be accomplished in various ways—the germs may be subjected to unfavorable conditions of growth for a certain number of generations, like unaccustomed food medium, various temperatures, the presence or absence of oxygen and other gases, the action of direct sunlight, solutions of various chemicals, the blood of comparatively insusceptible animals, etc. In all cases the same result is accomplished. The vitality of the organism is reduced and its power of exerting toxic influences in the animal body correspondingly lessened.

Nearly all of these methods have been tried with the blackleg clostridium, and all with more or less success.

The method in vogue at present by commercial producers of blackleg lymph is to attenuate the spores in affected muscle and connective tissue by means of heat, subjecting different lots of material to the mitigating influence of various temperatures and in that way producing lymphs of various strengths; the mild lymph, that produced at the higher temperature, to be used first; the strong lymph, that produced at a lower temperature, to be used a certain number of days after the first, when the first has prepared the animal organism to receive the second or effective dose. The lymph is sent out in powder form and is prepared by the stock-owner for immediate use. As a rule, 100 times its weight of distilled or boiled water is added to the lymph; the latter is then thoroly incorporated with the former with the aid of a mortar and pestle; the resulting mixture is filtered and the filtrate is used as inoculating material, applied with a hypodermic syringe.

The point of application is the subcutaneous connective tissue in any part of the body—usually at the neck or shoulder or near the end of the tail. I prefer the end of the tail because, if a careless operation is performed, and we may look for this when the work is left to a novice, resulting infections are more apt to remain local. General blood-poisoning is less to be feared, and the sloughing off of a few inches of tail will result in no serious permanent injury.

Protective inoculation for blackleg seems to be a solved problem. But as to the best way to perform it, the best method of manufacturing material of a definite and reliable strength we have not yet learned all.

Whether the lymph should be single or double is of less consequence. What I wish to see, and what I am striving to attain in my experimental work, is a single or double lymph of uniform strength,

that can be applied by the farmer or stock-raiser, in sections of the country where the services of a veterinarian cannot be had. But perhaps it is a little early to discuss that matter now. The facts stated regarding the different possible methods of checking the ravages of blackleg, each method applicable in its place, have been plain enough, I hope, so that it will be unnecessary to consume time in drawing conclusions.



ALFALFA INVESTIGATIONS IN CENTRAL KANSAS.

BY J. B. NORTON.

THIS summer, during the latter half of the month of August, it was the writer's fortune (or misfortune) to be allowed to go on an observation trip for the Experiment Station thru the central part of Kansas. One of the principal objects of my investigations was alfalfa, and as usual in such cases I saw less alfalfa than anything else. But what I did see only strengthened my conviction that the most of the region visited ought to be given the treatment that one of the men I met recommended for the farm he was living on. He said, "If I owned this land I would put every acre of it into alfalfa."

My method of travel was more or less of an experiment in itself. The outgoing trip was made entirely on foot, and alone except for the company of a collecting wheelbarrow that carried my baggage, etc. Besides performing the aforesaid function it acted as business manager and determined my route, at least so far as good roads were concerned, always attracted a large and inquisitive audience, started the conversations and so impressed ladies in stylish rigs and the drivers of mule teams—the two classes of people who always keep the road—that they recognized my imperative right to the road and always gave their share as well as mine. In fact it made a profound impression on every one except the Union Pacific baggage master at Abilene who refused to let it go thru as excess baggage to Manhattan when I was coming in.

Starting at Manhattan, August 15, and going by way of Junction City, White City, Herington, McPherson and Great Bend, I turned up in Rush Center, over two hundred miles from home, August 31.

In passing over this region just in the center of the state, I saw very little land that could not be more profitably devoted to raising cattle and hogs on alfalfa than in raising the crops that are now being grown on it. This assertion is made without consent of the owners of the land and in spite of the opposite testimony of many of them. "Alfalfa won't grow here, it's too dry," "The roots can't get thru the hardpan," "No good unless you can irrigate," "Won't stand pasturing in dry weather," "Must be where the roots can reach water," and many similar phrases were heard; and while there is some basis for these remarks in a few instances, yet on the whole they should be suppressed as pernicious to the best interests of the farmer who wishes to get the most good out of his land.

The acreage of the whole area is decidedly on the increase, as at least fifty per cent has been planted in the last eighteen months. The farmers are beginning to find out that even if alfalfa grown on the uplands will not yield like that grown in Colorado under irrigation, it will yield enough to give excellent returns for the time and labor. They are beginning to realize that they can make more out of prairie hay and pasture, with alfalfa grown on the lower parts of the farm, than they could out of a crop of wheat or a half crop of corn once in five or six years. But those who have the interests of the farmer at heart and those who have alfalfa seed for sale must not take it for granted that this awakening is general. There are thousands of farmers, who when urged to grow alfalfa, say as they do when listening to a sermon, that the lesson is not for them but for their neighbor.

In order to bring the point home, I will give examples from the different counties that I passed thru. During the journey of two hundred miles, practically all kinds of soil and conditions were examined; from the low, sandy bottom lands of the Kansas river to the high, limestone hills of farther south and the sandy, desert-like wastes in parts of Rice, Barton and Rush counties.

Thru Riley county my course lay in the Kansas river bottom land, where alfalfa is a success but is not grown to any great extent. In the very sandy ground the gophers kill it out badly and ruin the stand after several years. It gives three or four cuttings on an average and makes good pasture for hogs.

Geary county is well represented in the ranks of alfalfa growers by Mr. H. A. Huston, of Junction City, who has a farm several

miles south of town on which is thirty acres of fine alfalfa. Fifteen acres of this has been growing for ten years and not growing under the best conditions either, for the soil is gravelly and stony on part of the field, which is a sloping hillside on the edge of the Lyons creek bottoms. The lower half of this field was re-seeded this spring at the rate of one-half bushel of seed per acre; and, notwithstanding the prevailing belief that a field with a poor stand cannot be successfully re-seeded, got a good stand that was doing well at the time of my visit. Besides this field he had fifteen acres in the bottom which were several years old. From his thirty acres he got over one hundred tons last year and expects more this year. This hay commands a good price and Mr. Huston finds a ready sale for most of it right from the windrow, thus making his net and gross receipts almost the same.

In Morris county alfalfa grows well on the bottom land and will do well on upland if given a fair show. I saw a piece near Skiddy doing nicely on the top of the high hills of that region, in soil that I could scarcely dig because of the clay and gravel. If you ever go to Skiddy go up on that hill and be convinced that alfalfa will grow where its roots cannot reach the water. At White City I found the only piece of subsoiled alfalfa on my trip—a three-acre piece belonging to Mr. W. R. Bigham. While the subsoiling may not make a remarkable difference in this case, still the field seems to enjoy the drouth better than the unsubsoiled fields near by. This field shows the superiority of alfalfa over red clover and timothy, for of the three which were sown together the alfalfa alone remains and yields $1\frac{1}{2}$ tons per cutting on each acre. All thru this region, which is on the divide between the two river systems and is the highest land in this part of the state, there are fields of alfalfa usually away up on the highest prairie country, and at the time of my visit growing and green in spite of the fact that they had had no rain for weeks.

In Dickinson county, a mile or two west of Herington, lives Fred Meyer, a German farmer, who has had alfalfa on his place for over eleven years and probably will continue to grow it for all time to come. He finds no trouble in making it pay and of course thinks it is the crop. He often gets four cuttings from the lower portion of his 23-acre field which is on the slope of the Lyons creek valley. This creek is lined with alfalfa—as Mr. Meyer says, “most everybody has some alfalfa in here.”

In the northern part of Marion county along the Rock Island track there was little alfalfa to be found, tho what was there clearly indicated its value in that region. Between Tampa and Durham is a ranch belonging to Mr. J. Jacody, of Marion. On this place there are over two hundred acres of alfalfa, largely on upland soil and doing well; used for hog pasture in part, but showing up green and fresh amid the dried-up appearance of the surrounding fields. With such large centers of infection, alfalfa is liable to come into general use in this part of the country; and this one ranch is not the only place in the county where alfalfa is grown. There are numerous fields of from ten to fifty acres scattered all thru the northern part of the county and I am told that it is more abundant in other portions.

Of all the regions investigated, the eastern part of McPherson county seems to be best adapted to the growing of alfalfa without irrigation. The "flats" east of the county seat, McPherson, are very rich, and ought not to be wasted on wheat or corn. The larger part of the farmers have five to ten acres of alfalfa to supply their needs in the way of hay and pasture. As an example, take the owner of a farm four miles east of McPherson, Mr. R. D. Dean, who has five acres, sown three years ago. It was cut twice this spring, and pastured by fifty head of hogs for three weeks, yet it will have to be cut a third time. Part of the field was once a lane and on this hard soil the growth is better than on a strip along side of it that was mulched for potatoes. The old potato patch in fact is poorer than the rest of the field. Besides this he has a larger field sown this spring, and expected to do some fall planting on some ground that he was having plowed for the purpose while I was there. It is claimed that alfalfa can be grown to better advantage in this region than it can without irrigation in the Arkansas river valley, and I think the claim a just one.

In McPherson I saw a lot of about half an acre planted to alfalfa and supporting a large flock of fine Black Langshan fowls, the appearance of the piece showing beyond doubt how the chickens liked it. The western part of the county is not so good as the eastern part but there are several fields of alfalfa that show up quite well.

In Rice county there is a large acreage of alfalfa on the Little Arkansas River. Some farmers have fifty or more acres in the rich bottom land devoted to it. But the part that attracted my attention was two fields, together making only eight acres, that for

nine years have survived the disagreeable climate of the high hills of that region on which the farm is located. The farm is the property of two brothers named Rose and is about ten miles east of Lyons. The boys say that seven seasons have yielded at least one good cutting: this year, taken as a sample, they got two cuttings of a ton per acre each time. In the next ten miles there are several fine fields, and tales of others much larger just off the road. One small piece on a creek bottom yielded three tons per acre the first cutting this spring.

Little Cow creek, west of Lyons, has several good fields along it. Mr. J. F. Caldwell has about twenty acres—four of which were planted this summer after the rye was cut from the ground. For six weeks the seed lay in the dry ground, and then germinated when a rain finally did come. At the time of my visit it was doing well, roots over a foot in some places, and a thick stand all over the field.

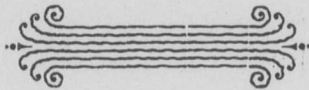
From here until Ellinwood in Barton county was reached I saw no alfalfa. Much of the country is made up of sand hills, tho there are large areas, like the Cow creek valley which is broad and almost an equivalent of the Arkansas river bottom land, which should yield great returns in this line. From Ellinwood to several miles out of Great Bend, I was in the Arkansas river bottoms where alfalfa is a staple crop. The only difficulties in growing it are the gophers that kill out patches over the fields where the ground is too sandy, and the grasshoppers that work in from all sides. The gophers do not bother much in the gumbo land, and this kind of soil yields as large crops of alfalfa as the sandy fields do. Along my line of travel in this region I saw several fields of forty or fifty acres in extent.

Up Walnut creek there is not much alfalfa after one gets beyond the direct influence of the river. What I saw seemed to be doing well and yielding good returns, but the farmers do not think it pays them. They know of the successful fields along the Arkansas and get discouraged because their fields do not yield like those. On the high lands, alfalfa, they say, will not grow; it dies out in a few years. I heard of some fields that were still growing after several years, trial, and saw some that were doing well on the slopes of the hills. Stray plants growing along the roadbed of the Santa Fe, in Rush Center, show a fine growth and indicate that the region is not altogether hopeless. Thus far up the valley I would prefer the risk on

a crop of alfalfa to the one that would have to be taken on a wheat crop—and the people seem to be getting rich on their wheat.

All along my route the only places where alfalfa will not be the best thing are in the sandy regions where the gophers kill it. Under irrigation these places would succumb and make the whole region an alfalfa country. Of course the uplands will not do as well as the bottom lands, but the crops of alfalfa harvested will pay better than a failure in wheat and corn, and be worth more than a good crop of both, leaving the prairie hay that would have been used as feed for clear profit. The only essentials for success are: a farmer with a reasonable amount of horse sense, a clear piece of ground in good shape, and lots of seed—one-half bushel or more for upland. Then sow early, to get a good start before dry weather, keep the weeds cut, and don't pasture too close, and with a few other precautions any one can raise alfalfa on the uplands and make it pay.

Subsoiling is not much practised, but would, I think, help. Nurse crops are not usually of any great help in the upland, and as a rule it makes little difference whether the seed is drilled or sown broadcast. The element of chance enters into the question to a considerable extent when the field is making its first start. Dry weather, insects and weeds are only overcome by persistent effort. The "try, try again" method is the most successful with alfalfa. A man out on Walnut creek tried three times before he got a stand, but now his field "is a thing of beauty and a joy forever."



MY CHRISTMAS GIFTS.

BY FRANK PARSONS.

AS a boy, Christmas was pure delight. It was the brilliant point on the somber surface of the year—the focus of hopes and happiness—the pivot of our little universe. But when I grew old enough to *make* gifts, as well as receive them, a shadow swept over the beauty of Christmas day. Not that giving was distasteful to me. On the contrary I soon learned that the pleasure of giving was greater by far than the pleasure of receiving, provided the proper gift could be chosen and I could find means to procure it—that was what bothered me, a fitting selection within my means. For weeks before Christmas I used to go thru every avenue and alley in my brain with a torch in each hand to see if I couldn't discover an idea or two—but it seemed very hard to think of anything my friends really needed that I was able to give them.

All that has passed away and Christmas is again a pure delight. One Christmas eve I went to visit a friend who had lately returned from a tour of the world. He had collected a great number of curiosities and had invited me to spend the holidays in helping him classify and arrange them. The evening was passed in unpacking rare birds, pressed flowers from every clime, tusks of elephants, ostrich feathers, insects, gorillas, implements of rude peoples, books in all sorts of languages, photographs innumerable, stamps, coins, etc.—a wilderness of entertaining and instructive objects—among which I moved as in a dream, a dweller in the halls of Fantasy.

I went to bed with a brain full of brand new ideas and a body just tired enough to make sleep a real pleasure. I had hardly touched the pillow before I was conscious of being again in the great museum. I remember distinctly picking up an old copper lamp that my friend had told me he had bought in a Bagdad shop because it reminded him so much of Aladdin's wonderful lamp. He laughingly said he had rubbed the queer lamp in a half hope the genie would come. I smiled and rubbed it, too. Now on my midnight return to the museum, I half unconsciously rubbed it again when I came to it, just as I rub pussy's head whenever she's near me, because of a habit associating the ideas of pussy and rubbing. I had no sooner touched the lamp than a white mist rose in the room and a giant form came out of it.

"Who are you?" said I.

"I am one of the genii of the lamp—a power of nature some call me. What is your wish?"

"What lamp is this?"

"It is Aladdin's lamp—the lamp of knowledge we call it."

"You are subject to my orders, are you not?"

"Yes."

"Why didn't you come when I rubbed before?"

"You must have rubbed a tarnished place, or you didn't rub hard enough. You have to rub a bright place and rub pretty hard to make me feel your pressure."

"Very well; you'll always come when I rub a bright place hard. Is that it?"

"Yes, and I am awfully glad you've found the lamp. I was afraid nobody ever would find it again that had sense enough to use it, and I'm very tired of doing nothing all these hundreds of years since the lively times Aladdin gave us."

"Well, my boy, I'll make it lively for you, if you obey my orders."

"I'll obey you."

"Bring me a billion dollars."

"All right, but do you wish me to take it from those who have earned it, or shall I create new wealth to that amount?"

"The latter, of course; I have no wish to rob any one."

"Then you do not wish a billion dollars, for that would rob mankind either by taking the money they have earned, or by scaling down the value of their money by a vast and sudden increase in the volume of the currency. What you really want is not a billion *dollars* but a creation of property worth a billion dollars, with a due proportion of money, say about 25 millions, so as not to disturb your country's finances. Is it not so, my master?"

"Yes, that's it, and I wish you'd hurry up the matter, too, for I have lots of Christmas presents to make to-morrow and I haven't got anything that really suits me. I want to build a new chapel for the Kansas Agricultural College, enlarge the library of history and psychology, and establish a first class psychologic laboratory in which young men and women can gain a better knowledge of their own minds. I'd like to buy up the slums in all the big cities, tear down the rickety tenements, and replace them with model dwellings, schools, playgrounds and parks. And I want broad, asphalt roads from Atlantic to Pacific and from Lakes to Gulf, so that bicycles and

automotors can go anywhere and everywhere on the gallop. Then I'd like to give my native town \$100,000 for a public library. It's a shame that 1400 children should grow up without the advantages of a large and well selected library. And I want to satisfy the pet whims of all my friends—one wants a rifle, another a seal skin sacque, another a full set of superfine jewels, another wants to have the freckles taken off her face and a quarter of an inch off the end of her nose; can you do that, genie?"

"Yes, but she might not think her looks improved—we have to go deep to uproot healthy able-bodied freckles—it would leave her complexion very red."

"Then I want to print and give away a million copies of my books in which I've told everybody just what they ought to do, and I want you to watch them and see that they do as I say. Some of them it won't pay to watch. You'd better just clean out the slums of the cities—take the worst of the slumites and drop them into the far South Sea, and have a discriminating earthquake or cyclone that will weed out every saloonkeeper, gambler and miserable fellow in the country, then make congress pass a cast-iron immigration law that nobody shall come here that isn't good, self-supporting and able to speak, read and write English well."

"Wouldn't it be better to elevate all these people here and across the water, so that all may go and come as they please, and the world be one great happy family?"

"Yes; but is such a thing possible?"

"Oh, yes, if you use the lamp rightly."

"Well, we'll have the jewels and seal skin sacque and the billion of property first. Here are the names of those to whom I want you to give the jewels, etc., aforesaid, to-morrow."

"All right; I'll attend to that; and, as for the billion, I'll see what I can do for you. How would it suit if I split New York city in the middle of Broadway and put in a strip of new land the length of the island and four or five hundred feet wide, and see that the deeds are made out in your name?"

"That'll do pretty well."

"Or would it suit you better if I gave you a new invention or the MSS. of two or three books that everybody would wish to buy?"

"Well, I guess you'd better do both; and another thing, I want you to make me famous and handsome, and make everybody love me, and—"

"Now you're getting beyond me; I can't accomplish the last two commands."

"Why not?"

"Well, I won't say it's absolutely impossible. It looks a little that way to me. At any rate I can't do it, you'll have to call on the chief."

"So then you are not the boss genie—only one of the hired hands, eh?"

"Yes; that's about the size of it. I'm what we call a sub-angel."

"How am I to call out the chief?"

"You must polish the lamp very, very bright all around, and rub it vigorously thruout the whole circumference, then the chief will come. Maybe he can make you beautiful and give you the love of mankind."

"How will he do it?"

"By giving you wisdom and filling your heart with love for humanity. Men love the man who really loves his fellow men."

"Very well, you hurry up with that Broadway business and the jewels and the books and I'll rub up this lamp till it shines to suit the chief or anybody else."

I rubbed awhile very vigorously, but it polished hard and my attention was at last drawn away by thoughts of what I would do with the Broadway belt. After a time I broke away from these ideas and determined to devote myself with renewed vigor to the polishing I had begun. Pretty soon I stopped to get something to eat and again to chat with a friend, and each time when I came back I found that much of the work I had formerly done must be done again, for the polish had faded and tarnished. Again I was drawn away and when I returned to the work the lamp was gone. I heard a faint noise in the hall and rushing to the door I saw at the farther end of the long, dim corridor, a white-haired, old wizzened-up thief with a scythe in one hand and my lamp in the other, just disappearing in the darkness.

I told my wise friend of all this and he said it was a pity I had not been more diligent in polishing the lamp. Wasted time and opportunity is always a source of never-ending regret. Any young man of good ability with an opportunity to educate himself has a chance to win control of powers as mighty as the genii of the lamp, and a youth who neglects to use to the utmost his opportunities of gaining knowledge and developing his faculties is quite as unwise as I was

in the intermittent or spasmodic polishing, the neglect of persistent continuity and enthusiastic, tireless devotion in my experience with the lamp.

My friend was somewhat critical respecting the orders I had given the genie. He said it would have been better to ask the genie to tell me how to help the people learn to create some billions more wealth every year and divide it equitably. It would be better that everybody should have enough to be comfortable than that I should have a billion dollars, and he thought that a careful study of industrial and social arrangements and the best methods of using the powers of nature and art and association might discover a way to accomplish the purpose—union, science, invention, steam, electricity, machinery, are the genii of the lamp of wisdom possessing a power beyond the dreams of Aladdin.

"As to your gifts of jewels, etc.," said my friend, "there might have been a reaction—'mean thing, he gave her ever so much handsomer gifts than me;' 'I should think, if he's able to give such presents, he might have sent me a satin dress with the sacque and not be so stingy about it;' 'Yes, it's pretty but there's no love in it, it's just a formality.' That has been my experience, and I have concluded that the best way is to make my friends as happy as I can all the year around. The best Christmas gift is a year of love and devotion. After that some little token, just to emphasize the the day, is all you need—something that speaks of your friendship and love—something in which you have stored up a part of your life—something that has cost you some labor—*that* will gather the love of the years to itself, and light up the day with a joy that the costliest present can never bestow if not linked with a beautiful past."



COLLEGE SEWAGE AND MANHATTAN WATER SUPPLY.

BY J. T. WILLARD.

EVER since the installation of the system of sewerage at the College there has been complaint because of its possible effect on the water of wells in town, especially those of the northwestern section. With the outbreak of typhoid fever a year ago this complaint became more outspoken, and people who could drink with equanimity water drawn from a well receiving within a radius of 500 feet the drainage from a dozen barns and outhouses, were excessively exercised over the possible effect of the college sewage discharged a mile and a half away.

To those not living in the vicinity it may be explained that a considerable proportion of the college sewage is collected in settling tanks where the solids subside, the liquids flowing off into a ravine crossing the northeast corner of the college farm. This ravine enters the townsite of Manhattan near the northwest corner, and winds its way across the northern part of the town to the Blue river. During the greater portion of the year there is no water running thru the ravine, but storm waters often fill it to overflowing, and during wet periods there may be a small constant flow. When there is no water in the ravine except that from the sewage, the latter runs down the ravine sinking as it goes and disappears entirely within a few squares. It seemed highly probable that the wells in the vicinity of this portion of the ravine would be contaminated by the sewage. To ascertain definitely whether this is the case or not was the object of the investigation about to be described.

It must be borne in mind that the wells in question are subject to contamination from the domestic conditions obtaining at the premises on which they are situated, and ascertainment that the water is impure would not prove the college sewage the source of the impurity. To solve the problem a method was adopted which was suggested to the writer by Dr. R. C. Kedzie of Michigan. It consisted in determining the amount of chlorine in the waters, and then dissolving a large amount of salt in the water of the ditch, and making analyses to see if any increase in chlorine took place in the well waters. Three barrels of salt were dissolved in the water at a time when none of it flowed more than 800 feet into the city. The salt

was spread across the bed of the little stream, and strongly charged all the water flowing by until it was dissolved. Estimations of chlorine were made daily, in the water from the five wells nearest the part of the ditch where the sewage was settling, for eight days; then weekly for several weeks, and later at longer intervals. The water showed no variation in chlorides that could be traced to the introduction of the salt into the water. There were slight variations at times, but no considerable increase at any time. The last analysis was made October 22, fifteen weeks after putting the salt into the water of the ditch. Unless this time is too short to allow percolation to the ground water supplying the wells, it must be concluded that the college sewage does not reach them. Fortunately we are not without additional evidence bearing on this point.

When organic matter is exposed to natural conditions it undergoes oxidation. Its nitrogenous constituents form ammonia, nitrites, and, ultimately, nitrates. Water may contain organic matter which by boiling with an alkaline oxidizing solution yields ammonia. Ammonia so produced in water analysis is called "albuminoid ammonia," while that liberated by boiling with an alkaline solution simply, is known as "free ammonia." The estimation of free and albuminoid ammonia, nitrites and nitrates thus becomes of much sanitary importance. Water that has been contaminated by sewage or other organic matter may contain it in the various degrees of oxidation. Water yielding much albuminoid ammonia must be contaminated, altho absence of these ammonia-yielding substances cannot be taken as proof that organic impurity has never entered the water, for natural oxidizing processes may have changed it entirely to nitrates. A water rich in nitrates and lacking free and albuminoid ammonia, is one which has received organic impurities which have undergone complete oxidation. After such oxidation this organic matter is innocuous. In reference to possible transmission of typhoid germs it must be said that it is not known that they are destroyed by the natural oxidation process. Typhoid germs are very resistant, and it is not improbable that they are among the last to succumb to oxidation, and water once infected by them may continue dangerous even after the organic matter has been nearly all oxidized.

The water from the five wells before mentioned was analyzed, determinations of free and albuminoid ammonia and of nitrates being made. The results are exhibited in the accompanying table. The

figures given for chlorine are means of the various analyses made. The table also gives analyses of water from a number of other sources which it will be interesting to compare with the results upon water from the five wells. None of the five wells makes a bad showing on analysis. No. 3 is the worst. This is very badly situated with reference to possible contamination by sewage of the immediate locality. It is the farthest of the five from the part of the ditch

TABLE OF ANALYSES OF DRINKING WATER FROM CERTAIN SOURCES.
(Parts per Hundred Thousand.)

Number.	Free Ammonia.	Albuminoid Ammonia.	Nitrogen in Nitrates.	Chlorine.	Nitrates.
1.....	.0018	.0020	Trace.	2 03	Absent.
2.....	.0016	.0030	.0061	2.30	Absent.
3.....	.0054	.0056	.6800	3 60	Absent.
4.....	.0036	.0007	.0850	1.85	Absent.
5.....	.0048	.0002	.0120	2.20	Absent.
6.....	.0240	.0008	.0425	2 90	Absent.
7.....	.0140	.0000	.0213	1 90	Absent.
8.....	.0010	.0015	1.9890	10 75	Strong.
9.....	.0001	.0068	2.2100	23.50	Very strong.
10.....	.0002	.0140	.0425	2 95	Absent.
11.....	.0000	.0009	.5525	5 00	Absent.

The first five numbers in the above table are those of the wells near the ravine in which the college sewage sinks, and are numbered in the order of their distance from it. Numbers 6 and 7 are of wells on the "bench"; numbers 8 and 9, of wells in or near the business center of the town; number 10 is the city water supply, and number 11 the college well.

where the water was sinking. The absence of nitrites and the smallness of the amounts of nitrates and free and albuminoid ammonia, make it practically certain that none of these wells have suffered organic contamination unless it be No. 3, which is probably somewhat contaminated by the home sewage.

Comparing these with the analyses of water from the wells further down town and in the thickly settled portion, the most prominent feature is the nitrates, nitrites and chlorine in water of wells 8 and 9. These are in the heart of the city. It will be seen that they are not especially high in free and albuminoid ammonia, showing that tho much organic matter has entered them it has been largely oxidized to nitrates. It is not improbable that the sandy nature of the soil has much to do with this oxidation, but as mentioned above, we cannot be sure that pathogenic germs have been destroyed even when but little unoxidized organic matter remains. Wells numbered 6 and 7 are situated on the "bench" between the College and the business part of town. They are apparently free from contamination.

It would seem, then, that the college sewage does not contaminate the wells near which it is discharged, while the wells in the

thickly built parts of the town are loaded with impurities from their immediate vicinity, and may become a menace to health at any time, if not so at all times.

The question may be asked, "What becomes of the college sewage soaking into the ground if it does not reach the ground-water?" It may be suggested in answer that the northwestern part of the town is largely underlaid by a tenacious gumbo soil thru which water will scarcely penetrate. This may serve as a protection to the deeper strata. The water in the ditch, finding no easy passage downward, would be absorbed outward at the sides, rise to the surface and evaporate.



PRAIRIE FIRES AND THEIR PREVENTION.

BY GEORGE L. CLOTHIER.

PRAIRIE fires are the greatest curse of western Kansas. Not only do they annually consume millions of dollars worth of property, but they subsequently reduce the size of the vegetation, consume the humus in the soil, and hasten evaporation, thus giving rise to drouths and hot winds.

Much legislation has been passed in Kansas upon the subject of the prevention of prairie fires. As the result of amendment and bungling we practically have no laws on the subject on the statute books to-day. The so-called law contained in the general statutes of 1897 is inoperative because of a lack of provisions for calling elections on the question.

I have drafted the following bill so as to include all the good points of the dead laws that have been passed on the subject, and have added a few desirable features that experienced farmers have suggested to me. I hope the legislature of the coming year will see the importance of this subject and pass the following bill or something similar.

AN ACT for the prevention of prairie fires, providing for the making of fire-guards, prescribing penalties for the violation of the provisions of the same, and repealing all acts or parts of acts in conflict therewith.

Be it enacted by the Legislature of the State of Kansas:

SECTION 1. That when a petition signed by at least one-third of the legal voters of any county or municipal township, said one-third to be determined by

reference to the returns of the last preceding general election in such county or municipal township, shall be presented to the board of county commissioners of such county, or to the trustee, clerk and treasurer of such township, asking that a vote be taken upon the question of taxing the property of such county or township, not to exceed two mills on each dollar of valuation on all the taxable property in such county or township, for the purpose of protecting such county or township from incursions of prairie fires, said tax to be known as "a fire tax," the commissioners of such county or the trustee, clerk and treasurer of such township shall, within ten days after the presentation of such petition, call an election to be held within fifty days after the presentation of such petition, in such county or township, and shall give notice of such election by publication for at least three consecutive weeks in some newspaper published in such county or township, if any be published therein, and if none be published therein, by posting up written or printed notices in at least three public places in each voting precinct of such county or township, for at least twenty days preceding such election, which notices shall set forth the time and place for holding such election and the purpose thereof, which notices when for a county election shall be signed by the sheriff of the county, and when for a township election shall be signed by the trustee, clerk and treasurer of the township or any two of them: *Provided*, That where it has become a law, the question of a fire tax may by petition as above prescribed be resubmitted to the voters of the county or township at least once every five years.

SEC. 2. Such election shall be held at the usual places of holding elections in any such county or township, and shall be conducted by the officers or persons provided by law for the holding of elections in any county or township in this state, and such election shall in all respects be governed and the results declared in accordance with the laws regulating general elections in such county or township. The vote of such election shall be by ballot, the ballots used having written or printed thereon the words "For the fire tax" and "Against the fire tax." All persons qualified to vote at any general election under the laws of this state shall be entitled to vote at such election.

SEC. 3. If a majority of the votes cast at any such election be in favor of such tax, it shall be the duty of the county commissioners of such county, annually, at the time when other taxes are levied, to levy and cause to be collected a tax to prevent the incursions of prairie fires in such county or township; said tax shall be called a "fire tax," and shall not exceed two mills on each dollar of valuation on all the taxable property in such county or township.

SEC. 4. It shall be the duty of the township trustee in any county or township where this act shall apply to make a map of his township in a suitable book furnished by the township, and to subdivide his township into suitable and convenient fire districts, and to make the road districts within his township conform to the fire districts. It shall be the duty of the township trustee of any township where this act shall apply thru which a railroad is running to so divide his township into fire districts, where it is possible, that the line of said fire districts shall come to the line of the right-of-way of said railroad and not cross said railroad.

SEC. 5. The township trustee in any county or township where this act shall apply shall make out an estimate of the amount of funds required to properly secure his township from prairie fires, by either breaking, plowing, burning, mowing or any other necessary method, and shall present said estimate to the board of county commissioners on or before the first Monday in August of

each year, and it shall be the duty of the board of county commissioners to levy such tax as may be required to defray the expenses necessary to secure such township from prairie fires, but such levy shall not in any one year exceed two mills on the dollar of all the taxable property of such county or township. If such township trustee should fail to present said estimate in time for it to be certified upon the tax rolls, it shall be the duty of the county commissioners to make the estimate required of the township trustee by this section and to levy the above mentioned tax.

SEC. 6. In addition to the duties already imposed on the road overseers by law, the road overseers in any county or township where this act shall apply shall be and are hereby declared fire overseers of their respective districts, and it shall be the duty of such fire and road overseers to perform such duties as may be prescribed in this act.

SEC. 7. It shall be the duty of each and every road overseer in counties or townships where this act shall apply, within his road district between the first day of May and the first day of October of each year to cause to be plowed along the outside lines of his district, two strips of three furrows each, one on the line of said district, the other at least six rods inside of said line where there is open prairie, also in fenced pastures where the consent of the owner can be obtained; and between said dates to cause the prairie grass and other vegetation to be carefully burned between such strips of breaking. Such burned areas to be known as fire guards. In addition to the boundary fire guards provided for by this section, it shall be the duty of fire and road overseers in counties and townships where this act shall apply to plow and burn fireguards along every traveled public highway running east and west in their respective districts.

SEC. 8. Where a line of railroad passes thru or along the line of any road district in any county or township where this act shall apply, it shall be the duty of the road overseer of such district, between the dates aforementioned to cause to be plowed two strips of at least three furrows each, at least six rods apart, on all open prairie or fenced pastures, with the consent of the owner, along the section lines running the nearest parallel with said railroad, not nearer than one-quarter of a mile nor more than two miles from said railroad, making said strips continuous by running at right angles when necessary to keep within the distance above mentioned; and to cause the grass and other vegetation to be carefully burned off between said strips: *Provided*, That where there is open and unoccupied prairie the road or fire overseer may plow and burn said strips running parallel with said railroad, not closer than one quarter of a mile to the said railroad.

SEC. 9. The fire and road overseers shall draw the money due their respective districts, which money shall have been duly apportioned proportionately to the necessary expense required by such fire district to secure the same against prairie fires as provided in this act, in such manner as the road overseers draw the road money from their respective township treasurers, and each fire and road overseer handling money derived from such fire tax, shall, on the day prescribed by the law requiring road overseers to make settlement with their township board, present his accounts as fire overseer, which account shall be itemized and supported by duly receipted vouchers, and all accounts of said fire overseers shall be duly sworn to and subscribed by said fire overseers.

SEC. 10. The fire overseers shall be authorized to pay for labor faithfully performed as follows: For one day's work by man, one dollar and fifty cents;

for a day's work by man and team, plow, wagon or scraper, three dollars; for mowing at a rate not to exceed fifty cents per acre; and for plowing, not to exceed two dollars per acre: *Provided*, That all persons against whom such fire tax shall be assessed shall have the privilege to discharge the same in work under the direction of the road or fire overseer at the rates above specified.

SEC. 11. The fire overseers shall be authorized to adopt any other legal means at their disposal to secure their respective districts from the incursions of prairie fires and for the extinguishment of prairie fires started within the boundaries of their districts. For the execution of the provisions of this act they shall have power to warn out the able-bodied male citizens of their respective districts subject to poll tax to fight, subdue or provide against prairie fires which may threaten to destroy property within their district. The time such citizen works under the direction of the fire overseer for the extinguishment or the prevention of prairie fires shall be credited to the poll tax of said citizen. Any fire overseer failing to use proper exertion or wilfully neglecting his duties as prescribed in this act shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be fined not less than fifty dollars nor more than five hundred dollars, and shall forfeit his office.

SEC. 12. Any county commissioner, or township trustee wilfully neglecting his duties as prescribed in this act shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be fined not less than fifty dollars nor more than five hundred, and shall forfeit his office.

SEC. 13. All acts or parts of acts in conflict with the provisions of this act are hereby repealed.

SEC. 14. This act shall take effect and be in force on and after its publication in the official state paper.



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THE INDUSTRIALIST.

Published ten times per year by the Printing Department.

KANSAS STATE AGRICULTURAL COLLEGE.

Manhattan, Kansas.



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THE NEEDS OF THE STATE AGRICULTURAL COLLEGE.

KANSAS is one of 45 American commonwealths. Among these she holds a proud place. She has nothing to be ashamed of. But Kansas is still young. With the other 44 of these states she is brought into competition. Modern competition handles things without gloves. It strikes from the shoulder and gives no quarter. Some of these competing states are old, and rich in experience. Not only so, but they are rich in population and in capital and are near the great markets of the world. To hold her own with these, Kansas must utilize her resources. In these she is not lacking. They are practically boundless and she may draw upon them as the depositor in a sound bank may draw upon his account. But to do this she must know how. People tilled at the soil for some thousands of years with crooked sticks and plows drawn by oxen; but only recently have they learned to use steel plows, listers, disk harrows, self-binders, horse hay rakes, threshers, and other farm tools and machines that have come to stay until superseded by better. And how now about these newer and better appliances, and the new skill and knowledge that will make them possible and use them advantageously? Do we imagine that progress has reached its limit? Or do we believe instead that the world is but beginning to learn how to work to advantage and to tap the inexhaustible reservoir we call the earth? Some of us believe profoundly that the latter is the truth. We believe we might be emancipated in a measure from the drudgery that most of us endure thru life, and that we shall be when we but learn better how to draw upon our bank, and how to utilize the resources thus obtained. The object of an agricultural and mechanical college is to teach us how to do this. Kansas has such a College. We believe it is the best of its kind in the country, and daily growing better. It wants to grow a great deal better. Compared with what it might be and ought to be if it is to serve Kansas as she deserves to

be served, it is but an infant. The largest enrollment in its history, that of 1897-8, was 803. Among the thousands of Kansas boys and girls that number might disappear and hardly be missed in the census returns. Where Kansas is teaching hundreds she should to-day be teaching thousands to produce efficiently and to mix brains with their humus. But suppose these thousands should actually come to the Kansas State Agricultural College! The institution would be swamped. Its class rooms are now crowded. Its laboratories and library are entirely inadequate for the work it is doing now. Its professors are driven at the pace that kills, and are then able to give to their students but a fraction of the time and personal attention necessary to the best work. The salaries have been slashed and departmental appropriations clipped until department heads are well nigh in despair, the problem of making both ends meet and stretching the college income over the entire year has been for years left unsolved, and is now being grappled with at the expense of the efficiency of the institution. The college management feel it their duty to take the people of Kansas into their confidence in these matters, and to ask them what should be done. We believe it possible to be penny wise and pound foolish, to save at the spigot and waste at the bung hole, to economize in seed corn and let the crop rot in the field to save the expense of harvesting it. We do not believe the people of Kansas, when they understand the facts, endorse such economies; and we want them to understand the facts. Believing in the referendum, we now appeal to the people.

FEDERAL VERSUS STATE AID.

The bulk of the income of the institution is derived from the federal government. From this source the College received originally its half million dollar endowment, now yielding over \$28,000 per annum. From the same source the College receives the Morrill Fund appropriated by the act of August 30, 1890, and yielding now \$24,000. From the federal government, furthermore, the Experiment Station, located at the College, receives \$15,000 per annum. College and station together therefore now receive from the nation over \$67,000 per annum.

During the last twelve years appropriations made by the state have averaged about \$18,000 per annum, or five cents for each farmer paying taxes on \$1000 and worth, therefore, about \$3000.

Is it too much to ask that the state materially increase its appropriations?

WHAT WE NEED.

Note next some of the needs that should be met if the institution is to do its best work for the people of Kansas.

Buildings and Improvements: Dairy building. Dairy barn and improvements. Boiler house. Class rooms added to library building. Addition to chapel, or new chapel. College dormitory. Engineering laboratory. Chemistry and physics building. President's residence (burned April 5, 1895).

Appliances and Equipments: Dairy school equipment—cows and buildings. Steers for experimental feeding. Horticultural department—additional equipment. Shop equipment replenished. Engines, boilers, dynamos, etc., to heat and light additional buildings. Sewing machines. Steel floors, stairways and racks in library, for upper alcoves. Library books and magazines. Graphics instruments. Microscopes for veterinary department.

Teaching Force: Assistant veterinarian (on account of work assigned to college veterinarian by state live stock sanitary commission). Two additional professors.

Sewer: from College to Kansas or Blue river.

Figures for the above can be furnished.

WHAT WE ASK.

We are exhorted in the scriptures to "ask largely." We confess, however, that our faith fails us in this case, for we fear that were we to ask for all the institution needs some might think we were interpreting scripture too literally. That, however, depends upon the point of view. Whether a burden is hard to carry depends not simply upon its weight but upon how we attempt to carry it. Were the burden of taxation better adjusted all the above needs might be met with little inconvenience to the taxpayer.

In preparing our schedule, however, we assume that the tax laws will stand as now. Hence instead of asking for all the institution really needs, in order to do its best work for the producers of Kansas and enable them to hold their own in competition with other states, we have agreed to scale down our list of wants to the following modest proportions. We ask three things:

1. We ask that Kansas do for its Agricultural College what many states have done for their higher educational institutions. We ask for a "mill tax." Such a mode of supporting educational institutions is eminently fair and reasonable. As the state grows the in-

stitution grows; if the state booms, both boom, and if the state suffers from depression the institution is in a position to sympathize with it. With a certain revenue the speculative element is removed from college financing; the management knows what it may expect and can cut its coat according to its cloth. Visiting the institution frequently, inspecting its buildings, its appliances and its work, and conversing freely with its professors, students, and employees, it is evident that the Board of Regents can better determine how to distribute a given sum among the different departments of an institution than can a legislative body meeting biennially and remote from the institution. We ask for one-sixth of one mill on the assessed valuation of the property of the state; this would now yield about \$53,000 per annum.

2. Kansas is woefully behind other progressive states as regards instruction in dairying. The College needs a dairy building. It wants it. It is in earnest. It has proved its earnestness by establishing a small dairy school without the aid of an appropriation. Now it asks for an adequate appropriation to erect and equip a respectable dairy building. If Kansas believes the day of small things in dairy instruction is past the College will guarantee to give it its money's worth in return for a dairy appropriation of \$40,000.

3. We ask that the relation of the state to the college Endowment Fund be placed on a business basis. This fund amounts to about a half million dollars. The state, in accepting this from the federal government, obligated itself to maintain the fund intact and to guarantee from it to the College an income of 5%. Yet the state leaves the investment of this fund to the College Loan Commissioner elected by the Board of Regents of the College. The school fund, however, for which the state is not thus responsible to the federal government, the state itself invests. While investing the one why should it not invest the other, save the expense of appropriating for the care of funds and save the risk it now runs? We ask the state to take direct charge of the college endowment as of the school fund and to give the College, in lieu thereof, an annuity of \$30,000. Under the college management the endowment is now yielding annually something over \$28,000.

Our requests, then, in a nutshell, are: (1) a mill tax worth now about \$53,000 per annum; (2) a dairy building with equipment and a dairy herd, the whole costing \$40,000; and (3) a \$30,000 annuity in exchange for our half million dollar endowment. We believe the

interests of agriculture in an agricultural state such as Kansas, and the needs of the mechanic arts, coequal in importance with agriculture in the enabling act, demand so much for the proper enlargement and equipment of the Agricultural and Mechanical College. We invite inspection of the institution, its methods, its work and the use made of funds already entrusted to its management, with the confident belief that such inspection will convince the judicious mind that the expenditures requested will prove an investment yielding dividends substantial from the outset and growing with the lapse of years.



MAKERS OF THE KANSAS STATE AGRICULTURAL COLLEGE.

BY JOHN D. WALTERS.

VII. James Hervey Lee, A. M.

WHEN giving credit to the men who have located and organized the Kansas State Agricultural College, to those who have fought for its existence in the halls of the legislature, to those who have looked after its financial affairs, or to those who have advanced it to a high rank among the educational institutions of America, THE INDUSTRIALIST does not forget that their labors would have been in vain without the conscientious and energetic work of the professor in his class room and laboratory. "Some have planted and some watered." The frontispiece of this number presents a good likeness of a teacher and educator who richly deserves to be remembered among the makers of the institution,—Professor James Hervey Lee, A. M.

Professor Lee was born in Savannah, Ashland county, Ohio, July 11, 1830. His grandfather came to America from Ireland and located in Pennsylvania, where, in 1802, the father, William Lee, was born. William Lee was a wheelwright, but, after carrying on his trade in Ashland county, Ohio, for about ten years, he devoted himself entirely to farming, first in Ohio, afterwards in Michigan, and finally at Manhattan, where he died in 1881.

Professor Lee received his primary education in the public schools of Ohio, and at the age of eighteen commenced teaching; but being desirous of a better education, he soon gave up this work and started for Kenyon College, with a capital of eleven dollars and plenty of gumption and grit. Casting about for something to do, he became the partner of a book dealer, a friend loaning him a small sum to buy

a share in the stock. He now spent a part of each day in the store and devoted the remainder of his time to hard study; and working thoroly he graduated at the end of four years.

He then entered the theological department of the same college, and while studying for the ministry, he taught in the grammar school. In 1862 he was ordained minister and deacon in the Episcopal church and was appointed assistant to the rector of St. Paul's church at Steubenville, Ohio. Two years later he went to LaPorte, Ind., as rector of St. Paul's church in that city. In 1866 he came to Manhattan to accept the position of rector of St. Paul's church in this city and also the chair of classics and English literature in the Kansas State Agricultural College, occupying the latter position until 1875.

The reorganization of the College under President John A. Anderson greatly reduced the work of classical teaching and increased that of scientific and technical instruction. Professor Lee was at that time one of the strongest men in the faculty, but he was not in full accord with the newly appointed president and the radical methods of the reorganization. He was an adherent of the "humanistic" school and it hurt him to see his beloved work in history and English literature reduced to a greatly inferior position in the curriculum. The time was a trying one in many respects. He felt that the students looked upon him as a friend and father, and he disliked to leave the institution when it needed his conservative counsel, yet his power of doing good was limited by the disturbed conditions that prevailed in every direction. Two years after the reorganization, he left the College where he had worked so faithfully for almost a decade, conducting for a time an academy of languages in the city of Manhattan. In 1880 he was appointed superintendent of public instruction of Riley county, which office he held by repeated reelections until 1891, after which he became professor of English literature in St. John's School, at Salina, Kansas. Something over a year ago he retired to private life in his neat brick cottage half a mile west of the Agricultural College. One of his children, Mary Cornelia, has graduated at the College, and his oldest son, William Canfield, has been for nearly two years private secretary to President Will.

The Professor, as the dignified old gentleman is still called by his former pupils and collaborators, has done much for the College, not only as a member of its faculty, but also as the superintendent of Riley county and as a citizen of Manhattan. He deserves to be named among its most patriotic "makers."

"EQUALITY COLONY No. 1, B. C. C."

BY HELEN J. WESCOTT.

PERHAPS at no time in human history has the idea of brotherhood been so strongly emphasized as at present, and probably never before have there been so many attempts to give that idea a practical expression in industrial affairs. Organizations with this end in view are continually springing up, ranging from the more modest—those whose object is to secure coöperation among the members of a single industrial group, large or small—to the most ambitious—those whose ultimate aim is to include the whole nation, or even the whole world, in one vast industrial fraternity. Somewhere between these two extremes might be classed the organization known as the "B. C. C.," whose work it is the object of this sketch to describe; and in the following description the effort will be made to maintain, so far as possible, simply the attitude of a reporter, rather than that of a critic.

The Brotherhood of the Coöperative Commonwealth was organized in August, 1896, having for its object the promotion and encouragement of coöperative industrial effort in all possible ways—by education, by establishing or assisting already established coöperative enterprises, and by colonization. The membership of the organization rapidly increased until branches were established in every state in the union. The special plan which attracted the most widespread attention, was that of colonizing some sparsely settled state until, by the multiplication of such colonies, it should become a complete coöperative commonwealth, and thence spread out to other states.

After long deliberation the state of Washington was selected by the colonization department as the one in which this plan could best be carried out. The sparseness of its population, the mildness of its climate, the wealth of its natural resources, the liberality of its laws, and its situation as a coast state, seemed to offer just the combination desired; and in the fall of 1897 the first pioneers reached the colony site, consisting at that time of 280 acres of meadow, marsh and woodland in the northwestern part of the state, about two miles from deep water on Bellingham Bay.

The land was purchased and paid for, as was also a little later an adjoining tract of 160 acres; and a third tract of the same extent, consisting of magnificent timber land, was turned in as a membership fee by one of the colonists. The title deeds are held in trust by the officers of the national organization.

Only a portion of the land was cleared, and the pioneers lived for the first few months in log houses and tents among the stumps and trees, in a very primitive manner. The mildness of the climate, however, prevented this mode of life from being much of a hardship, and by the time spring had come, more substantial buildings were ready for the new arrivals.

There are now about 250 people on the ground, 160 adults and 90 minors. There are a dozen buildings, including a schoolhouse, two large apartment houses, a dining-hall seating 120 persons at one time, a bakery with a capacity of hundreds of loaves of bread a day, and a barn of huge proportions for storing the large quantities of hay and grain that they expect to raise on their rich land. As fast as material can be turned out from the new sawmill, each family will have a house by itself, selected and built in the order of arrival, on the beautiful townsite overlooking Bellingham Bay.

The work of clearing has been carried steadily forward, and this summer the colonists supplied themselves with nearly everything used on the tables. There were beans, peas of phenomenal size, cabbage, cauliflower, potatoes, carrots, etc., from the garden, milk from the cows, and the fishing squad in their sloop "Progress" kept this large family well supplied with fish. The surrounding woods furnished berries, which the children picked. During the summer the herd of cows was not large enough to supply the tables with butter, but a sufficient reinforcement was expected before fall.

Each head of a family must pay at least \$160 to join the colony. It is understood that those who are able to pay more should do so, but this sum is fixed as the minimum amount that will admit parents and minor children to membership. Machinery, if such as the colony can make use of, is taken on membership fees. All the adult members both men and women, work in some one of the departments, and each member receives from the community his or her board, lodging, medical attendance, sewing and laundry work free, and each is entitled to an equal share in the joint product over and above what is sufficient to supply these necessities to all. The buildings and machinery are owned by the community, but each

man's house will be as much his own as tho he had bought and paid for it, so long as he chooses to live in it, the only difference being that he cannot sell it.

They have a unique dinner-call which seems to serve its purpose perfectly. A circular saw is suspended from a large stump near the dining-hall, and when meal time arrives this is beaten after the manner of beating a drum, and the sound, which is very musical, can be heard all over the community. There are two calls for each meal, as there is not sufficient seating capacity for all to be served at one time. If you could respond to this call some evening, you would see a very busy and pleasant scene; the young ladies of the community are delegated to the service of waiting on tables, and they appear to enjoy it as much as do those who perform this duty at church socials. Usually some bright ribbon or flower in the hair bears witness to their desire to add to the artistic effect of the scene, and they surely succeed.

The claim is often made that if every individual were sure of his living, as the people are here, whatever the work done, no one would be found willing to do the necessary disagreeable work. Equality seems to have solved this problem, and in the simplest possible way—not by offering extra inducements and rewards for such work, but far more simply: whenever there is an unusually hard or unpleasant piece of work to be done that does not fall unmistakably within the province of one or more of the workers in any department, the statement of the need is made, and volunteers are called for. There have always been more volunteers than the work required, and that such calls are not infrequent among those rough conditions may well be imagined. It would seem that such a claim as the above can need no further answer.

Of their present position there and the prospects for the future, a great deal might be said. They work hard, and there is much work before them, but they are hopeful and cheerful. Many of them (and these, of course, the most cheerful and happy) are inspired by the thought that they are working to demonstrate a noble principle; others who might not hold out with this motive alone to urge their efforts, are encouraged by the knowledge that their labor is constantly increasing the value of their possessions, and that the financial strength of the whole community stands back of each one. Perhaps their greatest need at present is to secure a deep-water landing on Bellingham Bay. This they hope to do, and when it is accom-

plished it will greatly add to the value of their property, and facilitate exchange of products with those outside the colony.

The second B. C. C. colony, called "Harmony No. 2" was organized last August. This is an inland colony, chiefly composed as yet of residents of the state, and is so young that there are no special developments to report. A portion of the land turned in by the members here is cleared and under cultivation, however, and the samples of timothy, wheat, oats and peaches produced, and on exhibition at B. C. C. headquarters, are of immense size.

Since last spring the national headquarters have been at the town of Edison, about three miles from the colony site. Here have been the offices of the national secretary and treasurer, and from here the national organ, *Industrial Freedom* (of which 4,000 copies weekly are printed) has been issued. It is now proposed to remove the headquarters to Equality, as the first and largest colony established by the organization, it being thought that the work can be better and more economically handled in this way. All such matters are submitted to a referendum vote of the members of the organization, thruout the country.

In saying that the greatest need of Equality is a deep-water landing, I should have said its greatest material need. The greatest need of all is the addition to their number of young, strong, earnest men and women who would look upon the building up of a coöperative commonwealth in that beautiful, fertile, western country as a worthy life work, and one to which their strength and talents might gladly be given. As it is, the prospects for Equality are good, for the soil is rich and the people industrious; but the advent of a few hundred young people animated by these motives would do more in months for this and any future colonies, than could otherwise be done in the same number of years. The resources of their chosen state seem to be almost limitless; the natural beauties are magnificent beyond description, and the climate most favorable. All that is needed to transform it into the veriest paradise is willing hands and earnest hearts working for the common good, and never losing sight of the broader object beyond and above the success of their own community—the advancement of the spirit of brotherhood.

BOARD OF REGENTS.

THE Board of Regents of the Kansas State Agricultural College met on November 15, and adjourned on November 18. All members were present at portions of the sessions except Mrs. St. John, who was in California.

The minutes of last meeting were read and approved.

The President of the College was asked to prepare a course in civil engineering and a course in advanced architecture, to be laid before the regents at their next meeting.

He was also asked to suggest measures for strengthening the the course in domestic science, as recommended by Professor Stoner.

Professor Stoner was made Dean of the Women's Department.

The degree of master of science was conferred on Mr. Elam Bartholomew, of Rooks county, for special proficiency in botany, in which he has made extensive original researches.

Doctor Fischer reported on the sanitary condition of the college farm house. Regent Limbocker was authorized to make such changes as might in his judgment be found necessary.

Voted that the Domestic Science Hall be dedicated on January 6, 1899. A program was prepared.

It was voted to request the legislature to accept the college endowment, and itself provide for the investment of the same, and give to the college annually in lieu thereof a lump sum of \$30,000.

Voted further that the legislature be requested to appropriate by law an annual tax of one-sixth of one mill upon all property of Kansas subject to taxation.

Regent Limbocker, as purchasing agent of the dining hall, submitted his report, which was accepted.

The sum of \$27.50, equaling one-half the value of the cow sold to Mr. G. B. Spohr, was deducted from the face of his note, because of the death of the animal.

The board adjourned for Thursday afternoon to attend the state dairy meeting at Topeka.

Certain railroads offering to furnish an excursion to the College over a fifty-mile radius from Manhattan, were asked to extend the limit thruout the lengths of their respective lines in Kansas.

Regent Noe was requested to conform his report as loan commissioner to the reports that have hitherto appeared in the biennial report of the College.

Board adjourned to meet Jan. 2, 1899.

LOCAL NOTES.

The college greenhouse owns sixteen species of palms.

Herbert C. Avery, second year in 1896-7, is now the captain of the football team at the State University.

Assistant Otis of the Farm department has been asked to deliver a lecture before the Missouri State Dairy Association, January 17.

During the month of October, the students eating at the College Dining Hall used $3\frac{1}{2}$ tons of milk, furnished by the Farm department.

THE INDUSTRIALIST, published by the Kansas Agricultural College, is excellently managed and contains much matter of interest. — *Lend a Hand Record*.

Prof. O. P. Hood, formerly of this College, has an illustrated article in the October number of *Machinery*, on "A Reciprocating Dynamometer."

The Alpha Beta annual, on the evening of December 3, was a success in every particular, orations, songs, "Gleaner," Mrs. Malaprop and all.

Miss Stella M. Blaney and Mr. B. H. Zimmerman were married in Manhattan, Nov. 30, and will be at home after Dec. 20, at Bigelow, Kansas. Both young people have been students at K. S. A. C.

William E. Smith, '93, has resigned his position in the Manhattan schools, to study law. Smith was a good teacher and will make a first-class lawyer.

One of our largest specimens of *Carludovica Palmata*, which is a palm-like stove plant, has produced an excellent spike of seeds, which have been carefully cured and will be planted with the hope of increasing our collection.

Mr. E. M. Wright, an entomologist in Illinois, asks for the entomological bulletins from this station, saying he sees so many references to them in publications outside of the state that he wishes to be placed on the mailing list.

Our thanks are tendered to Mr. F. S. Hurd, Meriden, Mr. C. F. Armstrong, Clyde, and Hon. Geo. Hanna, Clay Center, for their kindness in attaching one of our Dairy School circulars to each pay check sent their patrons on the last pay day.

Students H. D. Orr and W. H. Roberts enjoy the rare privilege of taking cooking for their industrial. Last term they studied home architecture with the third year girls of the Household Economics department. They intend to study medicine after graduating at this college.

The cash sales of the College Bookstore for the first two months amounted to \$1209.30, and the sales to the different college departments to \$194.20. The pay-roll expenses were only \$13.65, or less than one per cent of the value of the goods handled.

The reception room in the Domestic Science building is made pleasanter by the addition of a large picture of Mrs. Nellie S. Kedzie, '76. The picture is a gift from members of the classes of '98 and '99. The frame was furnished by the Hutto brothers.

Professor Cottrell divides his Christmas holidays between institute work and the answering of inquiries concerning the Dairy course to be given this winter term. The course will be well attended; there will be half a hundred students in the class.

Con M. Buck, '96, writes from Topeka, where he is working for the department of civil engineering of the Santa Fe railroad, that he has recently been promoted and that his salary has been raised. He adds that he received a prize at Omaha for his architectural drawings sent there from Manhattan last April.

Jesse B. Norton, who has been pursuing postgraduate work here since his graduation in '97, has left for Gulf View, Mississippi, where he will be employed on a poultry farm. By his faithful, earnest work and genial nature he has made many friends in the College and city and their sincere wishes for his future success go with him.

Prof. A. Emch has made surveys for a sewer line from the College to the Kansas river. It is the intention of the Board of Regents to ask the legislature for an appropriation to build an 8-inch tile sewer to some point in the Blue or Kansas River. It is feared that the Kansas incline will not give a sufficient grade for such a line of sewer.

One mail recently brought to President Will two letters, one from a county superintendent and the other from a congressman, each desiring back numbers of THE INDUSTRIALIST on account of the financial history articles. One enclosed cash and declared he "must have" the entire set, and both inquired whether the series will be published in book form.

Professor Cottrell and Assistants Burtis, Clothier and Otis attended, during the week beginning November 28, twenty-five dairy institutes at a total expense of \$52, or a trifle over \$2 per institute. It has usually cost the College from \$18 to \$20 for each institute. With an appropriation of \$2500 the College could hold dairy institutes at all of the 500 creameries, skimming stations and cheese factories in the state.

The college farm house burned down Monday night, Dec. 12. About three o'clock in the morning the occupants awoke to find the shed on the west side of the house, together with the kitchen, all on fire. The doors having been closed the smoke did not awaken them till the fire was well advanced. The house was completely destroyed; and the clothing, furniture and winter provisions of the tenant, Bassett Voiles, were all lost.

Professor Shelton, who was connected with the College for seventeen years as professor of agriculture, by request addressed the boys of the agricultural course in chapel on the subject of Agriculture in Australia. The professor talked the full hour, and the closest attention was given him. He said everything in a forcible manner, and every sentence contained something of interest about the wonderful land of Australia.

ATTENDANCE.—A count of the stubs in the secretary's office shows that the term just closed has been the best attended term in the history of the College. The enrollment of undergraduates has been as follows: 58 fourth years, 78 third years, 152 second years, 223 first years, 83 preparatory students, 43 special students and apprentices—a total of 639. Last year the enrollment of fall term was 630, and the year before only 554.

Professor Willard attended the state sanitary convention held in Lawrence, Dec. 8 and 9, under the auspices of the state board of health. He read the paper on "College Sewage and Manhattan Water Supply," which appears elsewhere in this number of THE INDUSTRIALIST. Professors Fischer and Bemis had planned to attend, but were unavoidably prevented. The convention was a very successful one, and should arouse an interest in sanitary affairs which is sadly lacking at present.

A postal card has come to the president's office sent from the Agronomic Institute of the state of St. Paul, at Campinas, in Brazil, addressed to the Imperial University, College of Agriculture, Kamaba, Tokyo. The surmise is that it was placed on the wrong steamer by mistake, and on arrival in New York the "Kamaba, Tokyo," was taken for "Kansas, Topeka;" the word "Manhattan" was afterwards put on with blue pencil. The postal card is international, printed in French, and acknowledges some Japanese bulletins.

The Kansas State Grange held its annual meeting at Overbrook, Dec. 13 to 16. Professor Cottrell represented the College at the meeting. The management of the College was endorsed in the strongest terms; the legislative committee was instructed to use all efforts to secure an appropriation sufficient to establish and fully equip a Dairy School at the College that should be equal to any similar school in the country, and the executive committee was directed to coöperate with the College in the effort to obtain excursion rates for farmers to visit the College.

Many farmers in the state succeed but poorly in keeping sweet potatoes during the winter months. The Horticultural department has in progress an experiment to determine the most suitable temperature for keeping this product during the winter. Trial lots are stored in locations ranging in temperature from 45 to 75 degrees. The temperatures are noted daily and frequent examinations made to note the soundness of the potatoes. Along with the temperature test, the attempt will be made to determine whether a storage medium, such as sand, chaff or charcoal has any influence in preserving the soundness of the potato.

The Dining Hall department has been a complete success during the fall term just passed. The average number of dinners served on school days has been 225, and the average number of regular boarders 85. The total amount received for meal tickets for the 3½ months has been about \$2,100. The average expense for labor, including the salary of the superintendent, Mrs. Hanson, has been \$112 per month. The department is managed so as to bring neither profit nor loss to the College. In September, owing to the purchase of many needed articles, there was a deficit of something over \$32. In October there was a credit of \$9.

The Kansas State Dairy Association at their recent annual meeting passed the following resolution: "That the most hearty thanks of this convention are herewith extended to the professors of the Agricultural College, who have so very materially added interest to our meeting, and we would further advise them that we are always ready to extend to them the 'glad hand' of welcome at all of our conventions; and that it is the sense of this convention that we work with them in all things pertaining to the advancement of dairy work in the schools, recognizing the importance of educating our patrons in dairy work so far as lies in our power as a body."

Altho there was no regular army officer at this College during the fall term, drill progressed with more than usual interest. There have been fewer absences among the officers and less tardiness among the men than ever before. The increase in students over last spring term made it possible to uniform and equip but three companies; these, however, took turns in the use of the guns, so that only one company had to drill without arms. No officer has been detailed as yet, for the winter term, but Mr. J. G. Haney, reënforced by Mr. R. B. Mitchell, both seniors, will continue the conduct of the department and do the work energetically and effectively.

From the *Primrose Bulletin*: "We are pleased to report the encouragement that our Agricultural College is giving the dairy industry, by arranging a series of institutes, whose main object is the educating of creamery patrons, pointing out to them wherein they can handle their dairies to a still better advantage and profit. It was our privilege to attend several of these institutes during the early part of this month, and we were much impressed with the very practical teachings that the college representatives gave, besides the discussions that were indulged in by the patrons themselves, all tending to show that there is a desire on the part of creamery patrons to learn more about cowology."

John H. Calvin, '84, died in Topeka, Kan., Nov. 3, 1898, of congestion of the brain complicated by other difficulties. Mr. Calvin studied law after graduation and was admitted to the bar in July, 1886. A year later he went to the Columbia College Law School, from which he was graduated with high honor in 1889. He then returned to Topeka to resume his professional practise, but the anxiety and labor incident to achieving success impaired his health to a considerable degree, so that he succumbed to a final illness of

only one week's duration. Mr. Calvin was a lawyer of high ability and scrupulous integrity, and more than once has been mentioned as worthy of nomination to a judicial position. He was married in 1886 to F. Henrietta Willard, '86, whom he leaves with the burden of the support and care of five children. His bereaved family have the sincere sympathy of all who know them.

The college representatives while attending the Nortonville institute had the pleasure of making a thoro inspection of the Nortonville cheese factory and of testing the cheese made there by Mr. C. B. Merry. They found this cheese to be equal in quality to the best New York cheese, and selling as fast as made at prices corresponding with its value. Yet hundreds of car loads of New York cheese are sold in Kansas because so few of our cheese makers know how to make good cheese. If all our factories turned out cheese as good as that made by Mr. Merry, there would be no sale of New York cheese in Kansas, and besides supplying home trade we would have a heavy foreign demand. Another argument for the Dairy School.

It is the plan of the College if railroad coöperation can be secured to have at least one excursion, and perhaps several from different parts of the state, next spring, by which farmers can come and visit the College and Experiment Station and learn what these institutions are doing. The pamphlet bulletins of the Experiment Station are sent to all farmers who desire them. By means of the press bulletins, with the help of the newspapers, useful information from the Experiment Station is still more widely scattered. Farmers who have read these publications will be interested in seeing the station itself. Talk up the matter thru the winter and let it be known that a large company from your county will take advantage of the excursion.

During the summer of 1898 the Agricultural College Dairy made an investigation of the patrons of the Meriden Creamery to ascertain the income they were realizing per cow for milk sold to the creamery. The poorest herd averaged per cow, \$7.54 annually, and the best one \$42.09, making a difference of \$34.55 per cow. Taking the poorest five herds the average per cow is \$9.44 and for the best five \$33.74, a difference of \$24.30 or .257 per cent. Where records have been kept it has been found that it takes from \$20.00 to \$30.00 to pay for keeping a cow. It will thus be seen that as far as milk is concerned the cows from the poorest herds are running their owners in debt, the only redeeming feature being the value of the calf produced. These figures illustrate very clearly the need and likewise the possibility of materially increasing the income from the dairy cow.

The department of Entomology has just placed on exhibition a large collection of scale insects, which makes that family quite prominent among the collections of the Hemiptera. The numbers prefixed to species are those of Cockerell's Check List. It is interesting to note the number of species collected in the vicinity of Manhattan. They are as follows: 222, *Kermes galliformis*, Riley; —, *K. concinnulus*, Ckll.; —, *K. pubescens*, Bogue; 359, *Pulvinaria innumer-*

abilis, Rathv.; 455, *Lecanium longulum*, Dougl.; 523, *L. armeniacum*, Craw.; 524, *L. pruinatum*, Comst.; 571, *Aspidiotus cyanophylli*, Sign.; 584, *A. ancylus*, Putn.; 586, *A. forbesi*, W. G. Johns; 590, *A. obscurus*, Comst.; —, *A. ulmi*, Johns; —, *Aspidiotus fernaldi*, Ckll., subsp. *cockerelli*, Parrott; 659, *Aulacaspis boisduvalii*, Sign.; 668, *Parlatoria proteus*, Curt.; 678, *Mytilaspis citricola*, Pack.; 723, *Chionaspis americana*, W. G. Johns; 725, *C. furfurus*, Fitch; 726, *C. salicis-nigræ*, Walsh; 727, *C. ortholobis*, Comst.; 728, *C. pinifolia*, Fitch; —, *C. platani*, Cooley.

P. J. PARROTT.

For many years the cedar trees of the Agricultural College grounds have been attacked by the well-known brown fungus, the so-called cedar apple (*Gymnosporangium macropus*). Some four years ago the department of Horticulture began hand picking the fungous growth on certain groups of trees to determine whether or not by this means the attacks could be reduced and injury prevented. From that time till the present those trees have been carefully gone over several times each year and the fungus removed from them. It has not, with very few exceptions, been allowed to reach the spore bearing stage. There has, however, been no diminution of the attack. The disease appears as vigorous at the present time as at any time in the past. The trees are more thrifty than they would have been had the fungus been allowed to grow undisturbed, but they are no freer from the disease than others that have had no attention. Cedars can not be freed from this disease by hand picking, at least if there are other trees of the same species in the neighborhood that are untreated.

Higher education for women at the Kansas State Agricultural College does not follow precedent. Young women are trained to be competent housekeepers. For many years the Domestic Science department has been the prominent feature of the College curriculum. In the last eighteen months especial impetus has been given the work by the increased facilities. The new domestic science hall has just been completed. The rooms on the first floor are given up to practical demonstrations in cookery and lectures on hygiene; on the second floor are the sewing rooms; in the basement is a lunch room well patronized by the students. The kitchen laboratory is a most attractive place. Round its tables gather the daily classes of young women; and here the supposition that college bred women can not learn the feminine arts is deposed. Each one of the number plays her part with a deftness that is the result of the rigid mental discipline of a college course. The necessity of absolute exactitude is one of the advantageous things they have all learned. Slipshod methods find no followers among them.—*Kansas City Journal*.

The following is a list of the farmers' institutes attended since November 28 by one or more delegates from the College faculty: Admire, Dec. 17; Alta Vista, Nov. 28; Asherville, Dec. 2; Barclay, Dec. 15; Beloit, Dec. 3; Benton, Dec. 1; Boyle, Dec. 1; Cawker City, Dec. 5; Colby, Dec. 3; College Hill, Dec. 21; Deep Creek, Dec. 17; Denmark, Nov. 28; Dresden, Dec. 2; Edgerton, Dec. 19 and 20; Fulton, Dec. 19; Goddard, Nov. 30; Green Mound, Dec. 1; Hutchinson,

Dec. 21 and 22; Indian Creek, Dec. 19 and 20; Lawrence, Dec. 13; Lecompton, Dec. 14; McLouth, Nov. 30; Meriden, Nov. 28; Mound City, Dec. 17; Narka, Nov. 28; Newton, Dec. 19 and 20; Nortonville, Dec. 12; Osage City, Dec. 16; Osawkie, Nov. 29; Oskaloosa, Dec. 16; Ottawa, Dec. 15 and 16; Overbrook, Dec. 13; Paola, Dec. 15; Peabody, Dec. 27 and 28; Peck, Dec. 1; Phillipsburg, Dec. 1; Russell, Dec. 13; Saltville, Dec. 1; Seabrook, Dec. 21 and 22; Scandia, Nov. 29; Smith Center, Nov. 30; Sunflower, Nov. 30; Valley Falls, Dec. 2; Victor, Nov. 29; Vinland, Dec. 13 and 14; Wichita, Nov. 29. Of these Professor Cottrell has attended 12, Assistant Burtis 16, Assistant Otis 8, Assistant Clothier 6. Others have been attended by President Will, Professor Nichols, Professor Hitchcock, Professor Stoner, and Assistant Hall.

The following extracts from the *Manhattan Republic* prove that the chrysanthemum exhibition recently given by the Horticultural department was highly appreciated: "The Horticultural department at the Kansas State Agricultural College inaugurated a new feature this year in the form of a chrysanthemum display. The show was a delightful success in every particular, and greatly appreciated by the large crowd in attendance. Fully 500 people were present at the lecture in the chapel in the afternoon, and many more viewed the elegant display of plants in the hall thruout the entire day. The principal feature of the exhibition was the showing of the different steps in chrysanthemum culture, from the seedling plants to the most highly developed novelties illustrating the modifications of flowers that can be produced by culture and training. The plants were tastily arranged on tables and in vases, according to color and variety, each bearing a label on which was written the common name of the variety. A profusion of types and sizes, from the dainty Japanese and Chinese sorts to the modern mammoth varieties produced by crossing and hybridization, were exhibited. Over ninety varieties were shown. The whole was such a gratifying success that the department will continue them in the future. Special credit is due to H. W. Moore, who is in charge of the greenhouses, for his work and the pleasing manner in which he arranged the display."

CREAMERY EMPLOYEES TO STUDY FEEDING.

The Meriden Creamery Company, of Meriden, Kan., find that their patrons who know how to feed get from \$40 to \$55 income per year from each cow, while the patrons who do not know how to feed get from \$18 to \$25 per cow per year; and that the net profits received from each cow by their best patrons are eleven times those received per cow by their poorest.

They also find that some of their patrons get no profit whatever from the skim milk, while others who know how to handle it get from 25 to 50 cents from each 100 pounds of skim milk fed. As there are 5000 lb of skim milk from each good cow yearly, the way it is handled makes a great difference in the profits from dairying.

The Meriden Company believe that if their employees are thoroly instructed in these lines of feeding, they can help the farmers who sell milk to the creamery to largely increase the farmers' profits,

and at the same time increase the profits of the creamery. For this reason the stockholders of the Meriden Company have decided to send all their employees to the Kansas Dairy School at Manhattan, and require them while there to make a special study of feeding dairy cows and of feeding skim milk to calves and hogs.

THE CIVIL ENGINEERING COURSE.

The Kansas State Agricultural College is not a university, nor is it a normal school. Its organic act demands that it shall be an institution "for the benefit of agriculture and the mechanic arts," and the Board of Regents are determined that the plans of the statesmen who founded it shall be fully carried out.

Having passed upon the matter favorably in November, the Board of Regents at their January meeting will probably organize a course of civil engineering, to be put in operation at the beginning of the spring term. The course of study has been considered by the faculty. The work for the first three years will be nearly the same as that of the present course in mechanical engineering or architecture, except in that it will have surveying practise in place of shop work in the spring and fall terms of the third year. The work of the fourth year will be technical thruout. It is the plan, we believe, to discontinue surveying in the general course. Professor Emch, who is to have charge of the field work, is negotiating with an eastern firm for two large tents and a camping outfit for the purpose of establishing a three weeks' engineering camp in the vicinity next summer, where railroad and bridge work will be taught in a practical manner.

THE DAIRY SCHOOL AND THE CREAMERY BULLETIN.

In a circular letter "To the patrons of the Manhattan Creamery," Mr. A. Jensen, the proprietor, says: "I would like it if all my patrons could attend the Dairy School of the Agricultural College, beginning January 3. Mr. Cottrell does not want young men alone, but thinks they can easiest be induced to attend. Every one should go. In a recent conversation with Mr. Cottrell I asked him how he would handle fifty or a hundred farmers, and the answer was: 'That part will take care of itself; if we lack equipments the legislature will have to give them to us. We are going to give each man a certain kind of work; some will feed the cows, others test the milk, others study the feed, and some will do the milking; it is not all going to be theoretical, but a man has to carry out a certain amount of work and study the results.' Nobody is too old to learn, and if your cows do not pay you, this course is apt to show you where the trouble lies. Make a trip to the College some afternoon and have a talk with the professors of the farm department, and every time you will learn something."

The Harper Creamery Company writes to the College: "We received a very interesting bulletin from you on the cultivation of alfalfa. We were very much interested in this bulletin and should like to circulate it among all of our patrons. You already have the names of the Wellington and Harper patrons, but if it would be less

trouble to you to send them to us, you may do so. We would like to have about five hundred. We will consider this a great favor if you can thus oblige us."

Austin & Ellis, creamery men, of Burlingame, Kansas, write: "We are in receipt of the special creamery bulletin of the 6th; and wish to express to you our appreciation of the work being done at the Experiment Station in the interest of Kansas farmers, and dairymen in particular. Realizing that the great need for the present and future of dairying is education in the selection of cows, growing of feeds most suitable and profitable in the respective localities, and the economical use of these feeds in knowing how to balance rations, we assure you that we will do all in our power to further the interests of the College in our territory."

A KANSAN HONORED.

Elam Bartholomew, Rockport, Rooks county, Kansas, who was granted the degree of master of science by the Board of Regents of this College at their November session, for proficiency in the science of botany and the arts of agriculture and horticulture, has studied Kansas botany for the past twenty-five years. Fifteen years ago he had made a complete collection of the flowering plants of Rooks county; about that time he met Professor Kellerman, who directed his attention toward the study of the fungi. It is in the collection and identification of the fungi that Mr. Bartholomew has made a world-wide reputation. He has discovered more species in Kansas new to science than all other botanists together. His discoveries number into the hundreds. His early species were published by J. B. Ellis and B. M. Everhart, under the partnership name of Ellis & Everhart. Later Mr. Everhart retired from the work and Mr. Bartholomew became associated with Mr. Ellis. The contributions of the firm are published in the *Erythea*.

The fact that Mr. Ellis is willing to take Mr. Bartholomew into partnership with him is evidence of the high qualifications of the latter. Mr. Bartholomew's name is found in every first-class herbarium in the world, on packets of fungi which he collected, identified and caused to be distributed.

Not only is Mr. Bartholomew a scientist, but he is also a public-spirited citizen, honored and loved by the people of his county. He has always been an active participant in farmers' institutes, or in any other associations for the promotion of agriculture.

CHEMICAL LABORATORY.

At the present writing the work upon sugar beets for the season in the Chemical department of the Experiment Station is not quite complete. The general average so far is 11.41% of sugar in the juice. This is slightly below the record for last year. This year there seem to be somewhat more clearly indicated differences in sugar-content due to latitude or altitude. Out of 100 samples 12 showed over 14%, but all but one of these came from the northern or the western parts of the state. In Reno and Sumner counties a considerable number of farmers united to make a test of their respective localities. Of the 33 samples received from those

counties only one had over 14% of sugar. The average for Reno county was 10.98%; that for Sumner county was 11.32%. The richest sample thus far was furnished by Mr. A. Munger of Hollis, Cloud county; it gave 17.21%.

As in previous years the station has had very little success in inducing farmers to plant the beets in accordance with the instructions. It is a well ascertained fact that beets to be rich in sugar must be kept down in size. To this end close planting is usually necessary. Rows 18 inches apart with beets 8 inches apart in the row will give over 30 tons per acre if the beets weigh but 1½ pounds. This is a good weight to plan for, but beets of somewhat larger weight are often produced of good quality. It is evident that overgrown beets are not necessary to heavy tonnage. To plant and cultivate beets as close as 18 inches on a large scale requires special machinery, but our state can never be fairly tested as to its capacity to produce good beets unless those taking part in the test follow the methods of culture which experience has shown to give the best results.

The coöperative tests such as have been made this year in Reno and Sumner counties cannot be too highly commended. The station will not encourage tests by isolated farmers another year. Localities which appreciate the advantages of a successful sugar factory to local business and to agriculture should make careful tests of their soil before putting money into an expensive factory.

HOW THE COLLEGE REACHES THE EARS OF THE PEOPLE.

Should doubt exist in the mind of any one as to whether the College is reaching the people, he has but to read the agricultural papers. For some months the College has been sending out to the newspapers a weekly news letter. The letter was at first prepared entirely on the typewriter, and the edition consisted of some half dozen copies. It is now printed on the mimeograph, and the number has been increased to forty. The Experiment Station also sends out a press bulletin each week in addition to the less frequent pamphlet bulletins.

Our Agricultural department also furnishes the matter for the dairy page in the *Kansas Farmer*, while our Veterinary department edits the veterinary column.

These numerous letters and bulletins are being widely copied. For example, the *Primrose Bulletin* for November gives one-half its space to Professor Cottrell's press bulletin entitled "Keeping Milk in Summer." The *Jersey Bulletin* for November says, "A most practical treatment of the subject, 'Feed and Care of the Dairy Cow,' is given in the bulletin No. 81 of the Kansas State Agricultural College, Manhattan, Kansas." The *Chicago Produce* for October 15 gives nearly a column to Mr. Otis's statement regarding germs in milk dishes, and it also gives nearly two columns to Mr. Otis's *Kansas Farmer* article entitled "No Money in Milk—Why?" The *Prairie Farmer* for December 3 devotes a half column to "Notes from Manhattan College," including a paragraph by Mr. Otis on dirt in milk, and another by Mr. R. W. Clothier on Kansas sugar beets; while the *Dairy World* for November 25 gives five mentions and nearly two pages to Kansas State Agricultural College matter. *Colman's Rural*

World, St. Louis, for November 17, gives most of a column to the dairy school circular and a variety of notes from the college dairy.

These are but a few of the mentions that we find in the agricultural and other papers. Mr. George L. Clothier's article on the "Growth of Alfalfa in Northwestern Kansas" is reprinted in the biennial report of the State Board of Agriculture.

Since writing the above, we have picked up the *Kansas City Packer* for November 24, in which we find mentions scattered all thru. Speaking of the Dairy School the *Packer* says: "It is hoped that the lawmakers will deal liberally with the school. Its work is of a great value, and the better the school is conducted and maintained the more valuable it will become. The creamery and dairy industry of Kansas returns over \$8,000,000 annually to the state, and is constantly increasing in magnitude and importance. It is worth promoting and fostering, and a liberal legislative appropriation in aid of the dairy school of the Agricultural College will be money well invested.

STATE DAIRY SCHOOL.

The following excerpts from an article in the *Topeka Daily Capital* on "The Needs of a State Dairy School" represent the general feeling of the farmers and dairymen all over the state:

"We have at Manhattan the largest and best equipped Agricultural College in the world, with a faculty of forty instructors and a student body of 800 young men and women.

"The fact to which the *Capital* wishes to invite the attention of every member of the legislature is that altho this great Agricultural College has an endowment of \$500,000 it has absolutely no endowment for a dairy department, and the primitive dairy school built up by Professor Cottrell, the member of the faculty in charge of the farm and stock work of the College, represents a total investment of but \$1500.

"It is apparent that little can be done by Professor Cottrell or by the Agricultural College towards educating dairy farmers on so petty an outlay as this, yet the practical service rendered by this little school has been so creditable that the president of the State Creamery Association, in control of the principal creamery in Kansas, has made an order that every man in charge of the skimming stations of his creamery must take the course of instruction at the dairy school.

"The creamery men and the dairy school will ask of the next legislature an endowment that will place this school on its feet and enable it to do the work which ought to be done by our Agricultural College for the promotion of the promising dairy industry of Kansas and make this what it is in every way adapted to be, the chief dairy state of the union. The appropriation that will be asked for is \$40,000. If this sum is appropriated as an endowment of a State Dairy School no annual appropriations and no further cost to the state will be required, the school being self-supporting.

"The sum asked for will give Kansas not only a dairy school equal to Iowa, New York, Wisconsin or Minnesota, but a herd of 150 cows with which to conduct experiments. There is no dairy school in any state which carries on such experiments, but the value of this branch

of work at any school professing to fit students for dairy farming is obvious from the fact that the average dairyman in Kansas produces hardly one-sixth as much milk per cow as the best dairymen, and according to Secretary Coburn's pamphlet on the cow in Kansas the average product of milch cows is only about one-twentieth of the potential milk-producing capacity. There are skimming stations in this state whose patrons produce but \$31 per patron during the year, whereas the average patron of the Meriden creamery produces \$148 per patron. This indicates the possibilities in dairying when conducted on scientific principles and is an eloquent demonstration of the need of a well-equipped dairy school. The average product of a single milch cow in Kansas is said to be about \$9, but there are skimming stations whose patrons are able to get \$55 for the milk of every cow per annum. The average value of a calf fed on the skimnings is reported to be about \$8 at the end of a year, but there are patrons of skimming stations whose calves at a year old have sold for \$25 and higher.

"It is in the interest of these farmers and of the entire farming population of the state that this endowment of a dairy school is asked of the coming legislature. It is in the interest of diversified farming in its most practicable form. It is for the encouragement of the most promising industry at this time in the state. The State Creamery Association has enthusiastically endorsed this movement for a modern dairy school. It has the earnest support of such progressive Kansans as Secretary Coburn. For several years the *Capital* has urged the establishment of a State Dairy School that will put Kansas in this industry on an equality with such states as Iowa, Minnesota and Wisconsin and the butter-producing states of the East, and we believe that in this year of agricultural prosperity the necessary outlay for this purpose would be justified and would meet with the approval of the people. When Kansas exports, as it ought to do, twenty-five million dollars' worth of butter and cheese per annum, the prosperity of Kansas farmers and the value of Kansas lands will be permanently established."



BOOKS AND PERIODICALS.

In *The Irrigation Age* for November T. S. Van Dyke contributes his sixth paper on "Unprofitable Irrigation Works," in which he sums up the causes of the failures of irrigation companies.

VICTOR SERENUS. A STORY OF THE PAULINE ERA. By Henry Wood. Cloth, pp. viii-502, 4 $\frac{1}{2}$ by 7 $\frac{1}{2}$ in., \$1.50. Boston: Lee & Shepard.

This work is an attempt to draw a realistic picture of those far away times. In it the Apostle Paul figures as a character. Whether or not it is a true picture, we leave others to decide. The events are little known, but most people hold very positive views about them. The book has a wide range of the fanciful, the mystical, and the psychological—enough to meet many forms of these tastes so varied to-

day. To a large class of minds it will be useful in dispelling mystery and in holding up those much discussed events in a light more real than that which has prevailed.

D. J. H. W.

CHARLES CARLETON COFFIN. A Biography by W. E. Griffis, D. D. Cloth, pp. 357, 6 by 7½ in., \$2.00. Boston: Dana Estes & Co.

In summing up the impressions left after reading the above volume, most readers will be apt to note one characteristic standing out more prominently than any other; the success of the biographer in concealing his own figure, while he turns the flash light upon the object he wishes to reveal. Mr. Griffis is not among those biographers, all too numerous, who use the nominal subject of their work as little more than a background for their own figure. His book is what all biographies should be—like a painting which you must search closely to find the artist's name. Admirers of Mr. Coffin's works who wish for a clear and appreciative picture of his life will find it here.

H. J. W.

CARPENTER'S GEOGRAPHICAL READER. North America. By Frank G. Carpenter. Cloth, pp. 352, 5½ by 7½ in., 60 cents. Chicago: American Book Company.

This second volume of the series of geographical readers, intended to describe the several continents, their countries and peoples from the standpoint of travel and personal observation, carries the reader on an extensive tour to the most characteristic parts of the continent, studying the interesting features of life and work among the people of each country, learning how they are governed, how they live and what they do. While on this journey much useful knowledge and interesting information is gained concerning the natural resources and physical features. In the teaching of geography advantage may be taken of the travels of Mr. Carpenter, and much profit will be derived from the observational phase of the study as provided in this book. The text is enlivened and enriched by numerous illustrations, being mostly reproductions of photographs taken by the author.

W. C. L.

LETTERS ON EARLY EDUCATION. Addressed to J. P. Greaves, Esq. By Pestalozzi. Translated from the German manuscript. Cloth, pp. 180, 5 by 7 in., \$1.00. Syracuse, N.Y.: C. W. Bardeen.

The German originals of these letters have never been published, and they are probably no longer in existence. Mr. Greaves visited Pestalozzi and took great interest in his work. The ideas he carried back to England were the seed whence originated infant schools. On his return to England he corresponded with the great educator at Yverdon (Oct. 1, 1818, to May 12, 1819). The letters were first published in English, the London edition of 1827 being the one from which the present handsome reprint is made. As a whole these letters are more perspicuous than most of the translations of the difficult German of either Pestalozzi or Froebel. They deal with the subject of infant education and the direction of mothers in the training of their children. As these are the last, so they are in some respects the fullest exposition of Pestalozzi's views. Their value is especially great now when so much effort is being made to enlist the coöperation of mothers in the early education of children.

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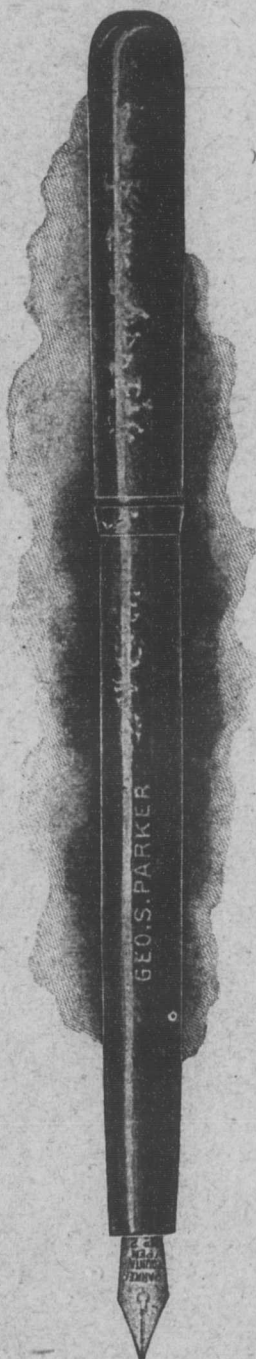
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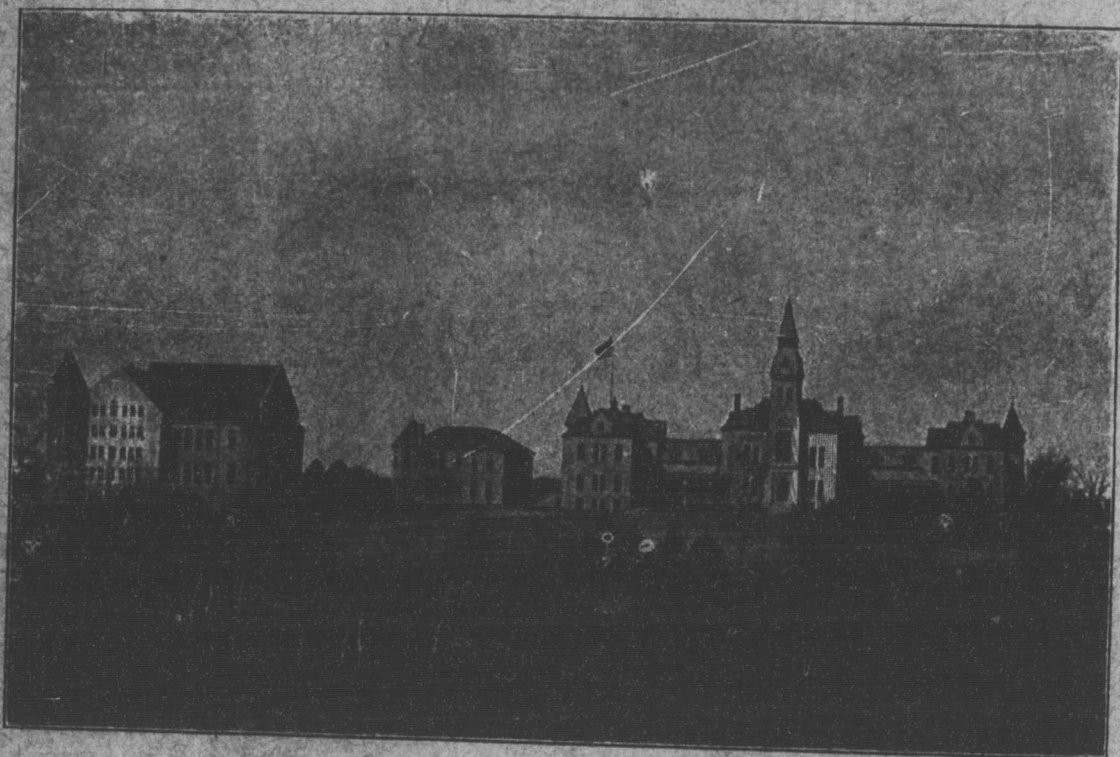
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{ Vol. 25. No. 2.
{ Whole No. 1019.

THE

Historical Society

INDUSTRIALIST.

Issued 10 times per year by the
KANSAS STATE AGRICULTURAL COLLEGE.

Established,
1875.

A
Magazine
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Promotion
of
Agricultural,
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EDITED BY THE FACULTY.

Managing Editor, - - PRES. THOS. E. WILL.
Local Editor, - - - PROF. J. D. WALTERS.

PUBLISHED BY

THE PRINTING DEPARTMENT,
CHAS. S. DAVIS, Supt.

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Entered at the Postoffice at Manhattan, Kansas, for transmission as second-class mail matter.

Subscription Price

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\$1.00

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.50

Manhattan, Kansas: College Type and Press.
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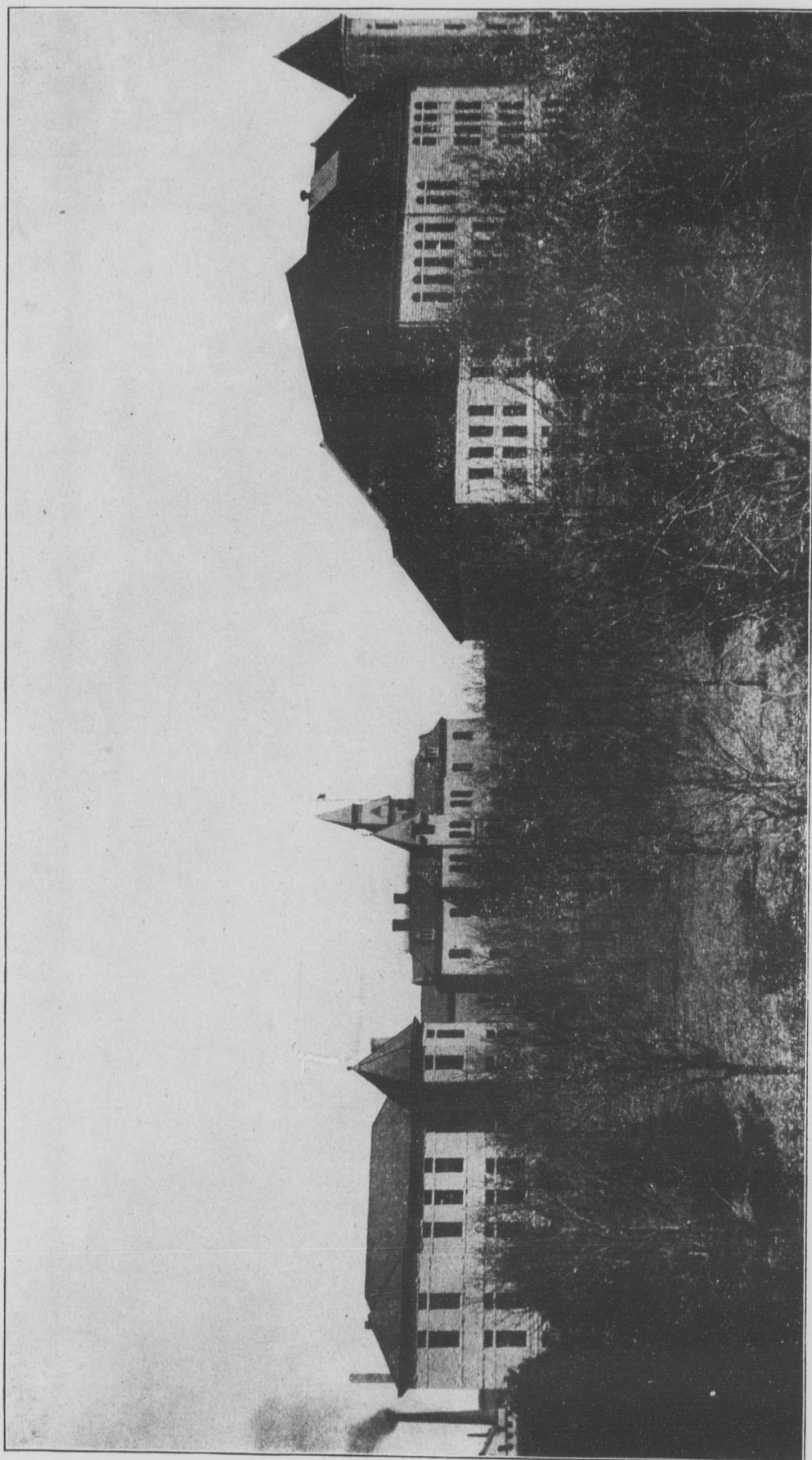
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Vol. 25, No. 2.

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Whole No. 1019

A STUDY OF CREAMERY PATRONS.

BY D. H. OTIS.

DURING the summer of 1898 the Kansas Experiment Station undertook to investigate the creamery business of the Meriden Creamery, Meriden, Kansas, from the patrons' standpoint, in order to find out the income realized per cow and if possible discover means of improvement.

The creamery records of 300 patrons were consulted for the amount of milk delivered, the per cent of butter fat, the pounds of butter fat and the cash receipts for 1897. Circular letters were sent out to the patrons stating the object of the investigation and asking for information upon the various phases of their dairy work. Out of the 300 patrons only 8 sent replies, and even these were not entirely satisfactory. One man when asked in regard to the questions, replied that if he could answer those questions he would run for congress. It thus became necessary to seek personal interviews with individual patrons, and draw out from them the information desired. Thru the kindness of the creamery management it was possible to obtain, in the limited time allotted to the work, records and notes from 82 patrons. We expect to continue the work by correspondence or otherwise in order to complete as many more of these records as possible.

The following table gives a condensed account of the best five herds and the poorest five herds from which we have records:

A YEAR'S RECORD.

	BEST FIVE HERDS.						POOREST FIVE HERDS.					
	1	2	3	4	5	Av.	1	2	3	4	5	Av.
Number of cows kept....	20	3	9	4	6	.....	27	12	10	3	8	.....
Product per cow:												
Milk, pounds.....	5,546	6,371	5,159	5,229	5,075	5,476	1,117	1,466	1,678	1,901	2,057	1,644
Butter, pounds.....	317	243	244	236	226	253	57	67	70	84	91	74
Income per cow:												
From milk.....	\$42.09	\$34.29	\$31.46	\$30.87	\$30.00	\$33.74	\$7.54	\$8.04	\$8.84	\$10.70	\$12.08	\$9.44
Total from milk, and skim-milk fed calves and pigs.....	54.38	45.87	45.14	40.33	39.95	45.13	20.69	18.04	23.42	19.12	36.71	23.59

YIELD OF MILK.

With these 82 patrons the average annual yield of milk per cow was 3441 pounds. The average of individual herds varied all the way from 1117 pounds for the lowest to 6371 pounds for the highest, a difference of 5254 pounds of milk, or 470 per cent. It should be noted that the herd that gave the highest yield of milk per cow did not give the highest yield of butter. Another herd that averaged 74 pounds more of butter made it on an average yield of 825 pounds less of milk. Taking the best five herds, there was an average yield per cow of 5476 pounds. The poorest five herds averaged 1644 pounds per cow, a difference of 3832 pounds, or 233 per cent.

YIELD OF BUTTER.

Next to the financial account, the yield of butter stands out as the most interesting point of the comparison. The annual average from the 82 patrons is 123 pounds. The lowest yield is from a herd of 27 cows which made an average of 57 pounds of butter per cow. The highest yield is from a herd of 20 cows that made an average of 317 pounds of butter per cow. The difference between the poorest and the best herd is 260 pounds of butter per cow, or an increase of the best herd over the poorest of 456 per cent. The average for the best five herds is 253 pounds, and for the poorest five herds 74 pounds—a difference of 179 pounds, or 241 per cent. It is interesting to note that the average yield of the poorest five herds is exactly the same as the difference between the best herd and the second best herd. It has been estimated that when you figure the cost of feed, labor and the interest on the money invested it will take at least 100 pounds of butter to pay for keeping a cow and that the profit comes from those cows that yield over and above this amount. If this be true, and certainly the estimate appears to be a conservative one, the cows that belong to these poorest herds are, so far as milk is concerned, running their owners in debt, and were it not for the redeeming feature of the calves produced these men might just as well go into bankruptcy at once.

CASH INCOME FOR MILK.

The strict dairy value of these various herds is shown in the cash income per cow for milk. The 82 herds averaged \$19.79. The best herd averaged \$42.09 while the poorest one averaged but \$7.54, a difference of \$34.55 per cow. The difference between the average of the best five herds and the poorest five herds is \$24.30 per cow.

With a herd of 10 cows, this difference would amount to \$243.00 per year and in 10 years would be over \$2400.

VALUE OF CALVES.

But some will say that it is not fair to make this comparison on income from milk alone, that there are many creamery patrons who milk their cows as a secondary matter and pay more attention to raising a good calf. Let us look a moment at the calf account. The patrons' estimates of the value of the calves at weaning time varied all the way from \$4 to \$20 per head. The value of the calves from the best five patrons averaged \$8 per head, and the poorest five patrons \$12 per head. Here is a difference in favor of the poor milkers of \$4 per head, which, however, would not go very far to compensate for the great loss in milk. Counting the value of milk, the value of the calf and the value of the skim milk fed to pigs, we have the following interesting and instructive information:

The total annual income per cow for the 82 patrons is \$32.86; for the best herd, \$54.38; and for the poorest herd \$18.04—a difference between the best and poorest of \$36.34 per cow. The average for the best five herds is \$45.13, and for the poorest five herds \$23.59—a difference of \$21.54, or 91 per cent. It will thus be noticed that the income per cow varies to a very considerable extent and that in spite of the fact that one of the patrons that received the lowest income per cow values his calves at \$20.00 per head. Suppose we estimate the cost of keeping a cow at \$15 per annum for the poorest herds, which sum is doubtless below actual cost, and one-third more, or \$20.00 per cow for the best herds. There would then be \$34.38 annual profit per cow from the best herd, and \$3.04 profit per cow from the poorest herd—a difference of \$31.34 per cow. This means that one cow from the best herd brings as much clear cash to her owner as eleven cows from the poorest herd. If we take the average of the best five herds there is a profit of \$25.13, while from the poorest five herds the profit amounts to \$8.59 per cow—a difference of \$16.54. In other words, one cow from the best herds will bring in as much clear cash as three cows from the poorest herds.

In all the above records and comparisons it should be noted that only averages of herds are given. It is to be expected that there are proportional variations among individual cows of the same herd, but upon this point we have no means of obtaining information. This can only be secured by the dairy farmer himself weighing and test-

ing the milk from individual cows. In a record received from a patron of the Rhinehart Cheese Company it was found that the income realized from the best cow, on the basis of butter at 15 cents per pound, was \$16 above the average of the herd. No individual record was kept of his poor cows and so the comparison can only be based on the average of the herd. This, as well as the experience of many others who have tried it, goes to show that it will pay any man to keep individual records.

WHY THE DIFFERENCE.

To some these figures are no doubt startling, and the question very naturally arises as to what is the cause for this great difference, varying all the way from a handsome profit to a positive loss. In seeking a solution of this question it is first necessary to study the farmer himself. His cows will seldom exceed his ideas of what cows should be. If he is a scrub farmer he will have scrub cows, if a general purpose man he will have general purpose cows, and if he makes a specialty of dairying he is likely to have the dairy type of cows. Out of 79 patrons who expressed themselves on the subject, 56 were general purpose men, 13 beef men, and 10 special dairy men. Two of the dairy men were dissatisfied with special dairy stock, one having already changed to Shorthorn and the other keeping Jerseys only because his wife wanted him to. Among the general purpose men there were three who said that the dairy business was a good thing if there were children to attend to the milking, and one of these even went so far as to say that when the children were not at home at milking time he would allow the cows to go unmilked. Such a class of people would not make a success of dairying even with the best of cows and under the most favorable conditions. There are nevertheless others whose milk yield is low that are eagerly seeking a "better light." To such there are two general principles to be considered:

1. THE COW MACHINE.—No matter how much power or how much oil we may use in connection with a lawn mower it is incapable of cutting over a certain amount of grass. When its capacity is reached it is no use to try to go farther. The man that would attempt to cut his hay with a lawn mower would not only be ridiculed and called "crazy" but he would be actually running himself in debt. Now this is precisely what some of these patrons are doing with their cow machines. The only difference is that the

patron does not know it and the haymaker does. There are some cows that simply do not have the capacity to convert feed into milk, no matter how much or how well they are fed. And yet some of these creamery patrons are keeping just this kind of cow machines, and think that because they are getting a little milk they are that much ahead, not realizing that the feed and work required to get it costs more than the milk is worth. Such animals should be disposed of as soon as possible for beef, sausage, bologna, anything—except oleomargarine. A man needs to be constantly studying his cow machines, weeding out the poor ones and raising the standard of those that remain. To successfully do this, special attention must be paid to the head of the herd and right here lies one of the secrets to the low yields of some of these patrons. Among the 82 patrons there were 19 that were using pure blood sires. These were distributed as follows: Shorthorn 14, Jerseys 6, Herefords 2, Red Polled 1, and Aberdeen Angus 1. The majority were breeding to grades of some beef type. A few patrons said they bred to anything they could find to get fresh cows. One man bred to a "Red Polled" because he was working for red color, and another man did not know what kind of a bull he had last year, but had a fine animal this year. When asked the breed he replied, "Don't know, guess he is a Red Polled." Profitable dairying will allow no guess work about the head of the herd. It is impossible to give too much attention to this point and no man should be satisfied until he has secured the best to be had. Failure on this point will result sooner or later in a contracted pocketbook.

2. FEED AND CARE.—The feeding problem is doubtless the most perplexing one that confronts the intelligent dairy farmer of to-day, and the way a man feeds his cows is a pretty good index of the amount of brains he puts into his work. It is interesting to note that the corn in the winter grain ration fed to the best five herds was usually balanced with bran or oats or both, and the roughness of corn fodder and prairie hay balanced with alfalfa and clover. In case of the poorest five herds, one received no grain whatever, three were fed on ear corn alone, and only one herd was so fortunate as to have oats in connection with corn meal. The roughness consisted of a stalk field, corn fodder, prairie hay or millet, only one herd being fed a little clover hay. A few illustrations will serve to show why some of these patrons had such low yields:

TABLE OF FEED RATIONS

DIGESTIBLE NUTRIENTS.....	Required.....	FIRST FORMULA.			SECOND FORMULA.			THIRD FORMULA.				FOURTH FORMULA		
		Corn fodder, 25 pounds...	Ear corn, 10 pounds...	Total.....	Prairie hay, 20 pounds...	Ear corn, 10 pounds...	Total.....	Corn fodder, 15 pounds...	Millet, 10 pounds...	Ear corn, 8 pounds...	Total.....	Alfalfa, 19 pounds...	Ear corn, 7½ pounds...	Total.....
Protein ...	2.50	.50	.78	1.28	.70	.78	1.48	.30	.45	.62	1.37	2.01	.59	2.60
Carbo- hydrates	12.50	8.35	6.67	15.02	8.36	6.67	15.03	4.98	5.17	5.33	15.48	7.09	5.00	12.09
Fat.....	.40	.15	.43	.58	.28	.43	.71	.09	.14	.34	.57	.27	.32	.59

Contrast the first three rations with the fourth in which alfalfa is used as the roughness. The first three rations contain feeds that are commonly and often exclusively used among these patrons. It will be noticed that in each case there is a deficiency of protein and an excess of carbohydrates and fat. This tends to fatten and dry up the animal rather than to cause her to give milk. Protein is what makes milk and these patrons need to supply it in larger quantities. With the exception of succulence and variety the last ration is an ideal one. It shows very clearly the value of alfalfa for dairy cows. The man that makes the best record among the best five herds mentioned, says that he would not think of carrying on the dairy business without alfalfa, and yet with all of its advantages this man is the only one among the 82 patrons that raises it.

Aside from the feed, more pains are needed in caring for the cows. One man said he sheltered his cows by two wire fences, another by a wood lot and still others by wind breaks, and there are 18 out of the 82 that compelled their cows to drink ice water from a creek or pond in winter. The dairy cow is a very sensitive animal and should be treated as a man would treat his best friend.

Taking these records as a whole there are some features that appear rather discouraging, and yet when compared with patrons of other creameries, the Meriden patrons have reason to rejoice. The money paid out to the Meriden patrons in 1897 amounted to \$148 per patron, while other creameries paid in the neighborhood of \$85 per patron, and in one instance as low as \$31 per patron. The very fact that the yields of many of these patrons are low only goes to show the greater possibility for improvement.

By giving more attention to the cow machine, by studying the most economical ways of feeding and by taking more care of the cow, their income may be materially increased. Dairy men in other states have

set a noble example in raising the income of their herds to 400 pounds of butter annually per cow, and in individual cases as high as 600 pounds per cow. What has been done can be done and the Kansas creamery patron with his cheap feeds, mild winters, good pastures, and abundant supply of stock water should and will, with proper education, be able to compete with creamery patrons of any state in the union.



HARVARD AS A STATE INSTITUTION.

BY THOS. E. WILL.

THE statement that Harvard College was once a state institution has been controverted. Following are the facts:

FOUNDING OF THE COLLEGE.

Harvard College was founded in 1636, by a vote passed at an adjourned meeting (October 28, Old Style) of the General Court of the Colony of Massachusetts Bay which convened on September 8 of that year.

The language of the vote was as follows:

The court agree to give four hundred pounds towards a school or college, whereof two hundred pounds shall be paid the next year, and two hundred pounds when the work is finished, and the next court to appoint where and what building.

The ensuing year (1637) the General Court appointed twelve of the most eminent men of the colony (among whom were John Cotton and John Winthrop) "to take order for a college at Newtown."

GOVERNMENT OF THE COLLEGE.

In 1642, during the administration of the first president, Henry Dunster, the general government of the college and the management of its funds were placed in the hands of a board of overseers established and empowered by the following act of the General Court.

THE ACT.

Establishing the Overseers of Harvard College. At a General Court held at Boston on the 8th of September, in the year 1642.

WHEREAS, thru the good hand of God upon us, there is a college founded in Cambridge, . . . It is therefore ordered by this court and the authority thereof that the governor and deputy-governor for the time being and all the magistrates of this jurisdiction, together with the teaching elders of the six next adjoining towns—viz. Cambridge, Watertown, Charlestown, Boston, Roxbury, and Dorchester—and the president of the said college for the time being, shall, from time to time, have full power and authority to make and establish all such orders, statutes, and constitutions as they shall see necessary for the instituting, guiding, and furthering of the said college and the several members thereof, from time to time, in piety, morality, and learning; as also to dispose, order, and manage, to the use and behoof of the said college and the members thereof, all gifts, legacies, bequeaths, revenues, lands, and donations, as either have been, are, or shall be conferred, bestowed, or any ways shall fall or come to the said college.

The "Court," then, i. e., the colonial legislature, created the governing board and placed upon it certain clergymen, it is true, but also the chief officers of state. Manifestly, a legislative body that could so constitute a governing board could reconstitute it should need require. This it later did.

Provision is next made whereby the "greater number of magistrates and elders which should be present, with the president, shall have the power of the whole;" but appeals might be made from this smaller body to the entire "company of overseers," then and now the ultimate authority over Harvard College subject only to the power creating them.

In 1650, by act of the legislature, the "corporation" was created, consisting of the president, five fellows and a treasurer or bursar "to have perpetual succession." This smaller body still exists; it is known as "the corporation" or "the President and Fellows of Harvard College;" it is the active, governing authority over the institution but is subject now, as at the beginning, to the overseers.

By the charter of 1650 all orders and by-laws required the consent of the overseers before going into operation. In 1657 the legislature enacted "an Appendix to the College Charter" which provided instead that acts of the corporation should have immediate force but might be altered by the overseers to whom the corporation was responsible. The government, then, of the institution was vested by the legislature in a board of overseers created by the legislature, and in a corporation also created by the legislature, the corporation to be responsible to the overseers, who, of course, were responsible to their creator, namely, the legislature.

The corporation and the board of overseers remain to the present time the governing powers of the university; and this charter with its appendix is now in force precisely as first drafted.*

This alone should settle the case. Other facts, however, will be given.

So important was the granting of the charter in 1650 held to be that fifty-seven years later we find the colonial legislature implying that the college originated by this grant of power. On Thursday, December 4, 1707, the following proceedings were had:

And inasmuch as the first foundation and establishment of that house [Harvard College, in Cambridge], and the government thereof, had its origin from an act of the General Court, made and passed in the year 1650, which has not

*Harvard University Annual Catalog, 1897-8, pp. 239-40.

been repealed or nulled, the President and Fellows of the said College are directed, from time to time, to regulate themselves according to the rules of the constitution by the said act prescribed, and to exercise the powers and authorities thereby granted for the government of that house, and the support thereof.

SATURDAY, Dec. 6, 1707.

The representatives returned the vote passed in council, the 4th current, referring to the college, with their concurrence thereunto.

By his Excellency the Governor, consented to,

JOSEPH DUDLEY.

If the "President and Fellows" had after that lapse of time come to regard themselves in any wise independent of the colonial legislature the above should have dissolved all their doubts on that score.

So much for the relation of Harvard College to the civil power of the "Province of Massachusetts Bay." We note next its legal position after the Revolution, when this province had become "the Commonwealth of Massachusetts."

In 1780 the state constitution was framed. In it are found "*the articles of the constitution of the Commonwealth of Massachusetts, confirming and securing to Harvard College the perpetual possession and enjoyment of all its estates, rights, powers, and privileges,*" being chapter v of the constitution.

In article I of section 1 the then existing powers and prerogatives of the president and fellows of the college were confirmed to them and to their successors forever. In article II of section 1 the property of the institution is likewise confirmed to the president and fellows and their successors. In article III the *personnel* of the board of overseers, the supreme authority over the college *under the legislature*, is defined and:

It is declared that the governor, lieutenant-governor, council, and senate of this commonwealth are and shall be deemed their successors; who with the president of Harvard College for the time being, together with the ministers of the Congregational churches in the towns of Cambridge, Watertown, Charlestown, Boston, Roxbury, and Dorchester, mentioned in the said act, shall be and hereby are, vested with all the powers and authority belonging or in any way appertaining to the overseers of Harvard College.

But lest the magistrates and clergymen or the president and fellows might imagine themselves to possess an independent jurisdiction and to constitute a state within a state the following wise and pertinent provision immediately follows:

Provided, That nothing herein shall be construed to prevent the legislature of this commonwealth from making such alterations in the government of the said university as shall be conducive to its advantage, and the interests of the republic of letters, in as full a manner as might have been done by the legislature of the late province of the Massachusetts Bay.

Note next certain changes made *by the legislature* in the constitution of this board of overseers. In March, 1810, the board of overseers was constituted as follows:

The governor, lieutenant-governor, counselors, president of the senate, and speaker of the house of representatives of the commonwealth, and the president of Harvard college for the time being, with fifteen ministers of Congregational churches and fifteen laymen, all inhabitants within the state, to be elected as is hereafter mentioned, shall forever hereafter constitute the board of overseers of Harvard College.

The elections of ministers and laymen were to be "made by the ballots of the major part of the overseers present at a legal meeting." State and Church, as in the ancient days, were thus still represented on the board of overseers; but it was by authority of the legislature that each and all of these held their seats.

With this act, however, appears an innovation found in the following language:

This act shall be in force when the overseers of Harvard College, as heretofore constituted, and the President and Fellows of Harvard College, shall agree to accept the provisions in this act contained.

Upon this the catalog triumphantly comments as follows:

The principle that the commonwealth could not change the constitution of the college, without the consent of the corporation and overseers, was thus distinctly recognized.

In the long list of acts and facts enumerated in the catalog, covering nine closely printed pages and 174 years of time, this is the first intimation that the authority of the legislature over the college was limited by the consent of the two boards created by itself. The provisions of this act were promptly accepted by the corporation and board of overseers. Two years later, however, the legislature reasserted itself; and—

without making any provision for the consent of the corporation or overseers, repealed this act, and restored the former organization of the board; but in 1814, the act of 1812 was itself repealed, and that of 1810 reenacted with the addition that the senate of the commonwealth should in future form part of the board of overseers. This act also contained the provision that it should not take effect until it was accepted by the overseers and by the President and Fellows of Harvard College. The act was accepted by both boards in March of the same year.

The insertion of such a provision, afterward repeated, in a legislative act may be explained either as an act of courtesy, in which case it is without signification in deciding the question whether the state controlled the institution, or as a surrender by the creator to the creature.

Josiah Quincy in his history of the University of Harvard describes the period as one of "high political excitement." In 1810 the government of the state was under the control of the party which favored the claims of the university. Two years later "the opponents of the act obtained dominant influence in all the branches of the state government and passed a law repealing the act of 1810. The corporation denied the right of the legislature to change the constitution of the corporation without its consent. . . . During these proceedings the political relations of Massachusetts were changed, and the government of the state was again placed under the same leading influences as had obtained the act of March, 1810, and a law was passed (1814) repealing the act of 1812. In this law the senate was added to the board of overseers, and the validity of the law was made to depend upon its being accepted by the corporation."

In 1834, by act of the legislature, membership in the board of overseers was thrown open to clergymen of all denominations.

In 1851 the constitution of the board of overseers was still further changed by the legislature. The act made the board to consist of—the governor, lieutenant-governor, president of the senate, and speaker of the house of representatives of the commonwealth, the secretary of the board of education, and the president and treasurer of Harvard College, for the time being, together with thirty other persons, as hereinafter defined and described, and no others.

The direct connection of the legislature with the government of the college is still further shown by the method of choosing the thirty overseers provided by this act. The thirty were divided into three groups of ten each. The members of a given group were to go out of office on the day of the assemblage of the legislature and their places were to be filled "by a joint ballot of the senators and representatives of the commonwealth assembled in one room;" i. e., they were chosen by the same electors and in the same manner as were and are United States senators. When the board of overseers had once been filled the number of classes was to be doubled and the size of each class halved: one class was to go out on each annual assemblage of the legislature, and the places thus vacated were to be filled by a joint ballot of senators and representatives as above described. Section 7 of the act renders members of the General Court, i. e., the state legislature, electing overseers, ineligible to a place on the board of overseers.

Notwithstanding these stringent provisions for public control, both the act of 1834 and that of 1851 provided that the assent of the

corporation and overseers must be secured before the acts went into effect; thus observing the courtesy or maintaining the subserviency of the legislature of 1810.

Next came the transfer of power to elect overseers from the legislature to the alumni. The bill providing for this change was introduced in 1854 but failed. In 1865 such a measure carried. This act, *passed by the legislature*, removed from the board of overseers the governor, lieutenant-governor, president of the senate, speaker of the house of representatives, and secretary of the board of education, and provided that graduates of four years standing instead of the two houses of the legislature should elect the overseers, and on commencement day rather than on the day of the assemblage of the legislature.

This act also required the consent of the two boards but was made repealable "*at the pleasure of the legislature*," nothing being said as to the necessity of assent by corporation and overseers to such repeal.

MAINTENANCE.

In 1636, by the vote in accordance with which the college was founded, the "court," i. e., the colonial legislature, agreed to give four hundred pounds to the institution. In 1838 John Harvard died and endowed the college with something over eight hundred pounds and his library of three hundred volumes. In 1642 an act of the legislature recites that "this court has given the sum of four hundred pounds and also the revenue of the ferry betwixt Charlestown and Boston" to the college. By the charter of 1650 the corporation was empowered by the legislature to acquire by purchase or receive by gift property not exceeding five hundred pounds per annum in value and to hold the same for the benefit of the college, such property to be exempt from taxation. In 1814 an act was passed by the legislature enlarging the power of the corporation to hold real estate. In 1889 an act was passed similar in tenor to that of 1814, but removing all limitations upon the power of the corporation to hold real estate.

Governor Bowdoin in a message to the legislature under date of June 2, 1786, said: "It [Harvard College] has always been under the patronage of the General Court [legislature] who from time to time have made grants for the support of its president and professors." He especially referred to the constitution, which he said declared it—

to be the duty of legislators and magistrates to cherish the interest of literature and science and seminaries of learning, especially the university at Cambridge. Under the regal government, to which it is hoped republicanism will in no instance be inferior, those grants were regularly made. Besides which, about twenty years before and down to the time of its abolition, there was in every new granted township one share reserved for and granted to Harvard College, exempted from all taxes: and similar reservations were intended to be made in all after grants of townships until the college estate should produce a yearly income, so much as that further grants both of land and money might with propriety and without discouraging literature be discontinued.

Inspection of the report of the treasurer of the college shows that the present income of the institution is derived from interest on notes, mortgages and railroad bonds, dividends on stocks, real estate investments, term bills and sundry sources not including legislative appropriations. The institution is one of the most heavily endowed in the United States. Its endowment is steadily increasing; in fact it has passed into a proverb about Boston that it is hardly respectable or safe for a local millionaire to die without remembering Harvard College in his will, while others give of their bounty before death. Are we, however, to understand that a state institution which by gifts from the rich has become independent of legislative appropriations has thereby passed from under the control of the state? If so, the supposed benefactors of the institution would seem to be after all but buyers of stock in the institution, thereby in time securing a controlling interest in its affairs. Is this the reason why the liberty of science, the pride of Harvard in numerous departments, notably that of theology, and the terror of conservatives and "orthodox," is so conspicuously absent in her department of political economy? If by gifts to institutions of learning, public or other, the wealthy seek to control education, bequests, certainly to public institutions, should be spurned as bribes, and the necessary revenue raised by graduated income and inheritance taxes, the proceeds of which and the institutions maintained by which would be under the control of the people.

Clearly from the foregoing, Harvard College has been during most of its existence a public institution under the control, first of the colonial, and later of the state legislature. Since 1810 legislatures have at times been implying that their acts relative to the college, before becoming effective, must be accepted by the two boards created by the legislature; while in 1865 officers of state were removed by the legislature from the board of overseers and the election of overseers was transferred from the state senate and

house of representatives to the alumni. Yet section 8 of that act, in accordance with which the whole act "may at any time be repealed at the pleasure of the legislature," must never be forgotten. While subservient legislatures, or legislatures chained by custom, tradition and precedent, may recognize as their superiors bodies of their own creation, a legislature may some day assemble on Beacon Hill that will reread the history of the government of Harvard College, assert its dignity as the fountain of law for the commonwealth of Massachusetts, and demand, if nothing more, that some measure of Harvard's boasted "freedom" shall be admitted to the class rooms in which her sons are taught the science of society and government and the laws governing both individual and social wealth and well-being.*



JOHN WICLIF:

The Morning Star of the Modern Day, in Language, Politics and Religion.

BY DUREN J. H. WARD.

THE world is often dull and dilatory in its recognition of true greatness. Many a hero has to die without a word of thanks from the race for whose good he has risked and sacrificed all. Yet later generations, for whom the fruitage of his labors falls more abundantly, rise up and call him blessed. Sooner or later humanity remembers its benefactors. Dear to its memory then are their names. Tho the meed of praise be tardy, yet it surely comes. So John Wiclif stands in higher esteem than ever before at the distance of five hundred years from his death.

That one is in advance of his age is what we mean by a *reformer*. How then can his own time fully appreciate him? To be as they were to be no hero. It would often save discouragement to remember that history teaches no plainer lesson than that one who would urge great reforms must look to future ages for sympathy. The unsympathetic times compelled Wiclif to wait for a biographer well nigh two hundred years. The greater the benefactor, and the more he

* When the above has been successfully met it may be thought desirable to consider the cases of the other institutions named in connection with Harvard.

has to recommend, the more sparingly often will his own age deal out an appreciative recognition. This response will vary, to be sure, among different peoples and in different times. One age is keenly alive to every suggestion of progress. It grasps eagerly at whatever claims to be new. The old it regards with suspicion and holds in disrespect. Another period is conservative in the extreme. Every appeal is made and every homage paid to the venerable past. Five hundred years ago the European mind was just beginning to emerge from a state much like this. By the middle of the fourteenth century the moral and intellectual blackness of the "Dark Ages" had been changed for twilight by the universities, or high schools, founded two centuries before. The English nation, on account of fortunate advantages, was in the van of this unconscious movement which was dissipating the gloomy mist of ignorance and superstition blown over the Roman world with the flood of Teutonic barbarism. The natural outgrowth of this increase of intelligence was that demand for liberty and privilege which partially secured its object by wrenching from King John the Magna Charta, the bulwark of English constitutional liberty. Then ensued a struggle between royalty and the commons under Henry III, lulled for a time during the reign of Edward I, more fiercely renewed under Edward II, and resulting finally in a triumph for the commons and in the dethronement and horrible death of the king. Edward III, in his long and uninterrupted warfare with the Scots and French, yet found time to resist the never-ending claims made by the papacy. In this he was supported by parliamentary "statutes declaring the independence of the English clergy." Within the church itself, on the other hand, this was a period of the greatest dissension. Such political and religious turmoil necessarily begot and fostered, at least in the more intelligent minds, a spirit of free inquiry into the civil and ecclesiastical rights of men.

BIRTH OF WICLIF.

Into such a national condition as this came John Wiclif, "The Morning Star of the Reformation," the eminent scholar, diplomatist, and preacher. According to John Leland, "The Father of English Antiquarians," Wiclif was born at Spresswell, England, not far from the River Tees, on the line between the counties of Durham and York. In this region of country the Anglo-Saxon element maintained itself with greater purity and tenacity than in the more

southerly parts. It is said that there are families of lower gentry there yet who have remained in uninterrupted possession of their estates from the Norman invasion, and almost even from the Saxon immigration. Lechler says, "From the bosom of the tenacious Saxon people, Wiclif sprang, . . . and his family belonged precisely to those families of the lower nobility in Yorkshire." (G. V. Lechler, John Wiclif, etc., vol. 1, p. 124.) These facts furnish a genealogical basis for the spirit of the man. His name is spelled in at least twenty-eight different ways, of which the one used at the heading is the simplest. The date of his birth cannot be fixed by documentary evidence, but the lines of his life are commonly marked by the years 1324 and 1384. However, for reasons seemingly good, it is probable that he was born somewhat earlier than 1324.

HIS STUDENT LIFE.

Of Wiclif's earliest education as little is known as of his birth. No doubt the folk-traditions of the Yorkshire people made lasting imprints on his youthful mind, and made him familiar with patriotic scenes and stories. His first teachers were probably parish priests. And when he went to Oxford, it must be borne in mind that he was simply attending a Latin school at which were gathered multitudes of boys under fourteen years of age. It must also be remembered that Greek language and literature were not studied, a want which is plainly seen in the learning of the times. There prevailed at Oxford in the first half of the fourteenth century a special zeal for mathematical and physical studies, which seems to have taken firm hold on the mind of young Wiclif. There had lived just before, and were living at that time, such men as Roger Bacon, Thomas Bradwardine, John Estwood, and William Rede. But Wiclif's passion for knowledge would not let him stop with the seven liberal arts. He entered zealously into theology, the highest developed science of his day. The course of study was of two stages—biblical and systematic. In the latter he seems to have been a faithful student of the works of Thomas Aquinas, Robert Grossetête, and Richard Fitzralph. It is highly probable that his student life occupied at least ten years and it may have extended to sixteen or seventeen. For twenty years after his entrance at college his name is not mentioned in any of the chronicles. It is quite certain that he resided at Oxford during the latter portion of the time as one of the regent masters, but of which college is not known. We find him Master of Balliol in

the year 1361. In 1365 he was appointed warden, head master, or president of Canterbury Hall, a newly founded college at Oxford, but the following year, the founder having died and another primate of different views having been appointed, Wiclif was deposed. He appealed from the archbishop to the pope, but after three years of varying fortune, he was rejected and his opponent confirmed. A reason for this result may perhaps be found in the fact that, while Wiclif's case before the pope was pending, a controversy arose regarding the payment to the pope by the English of a thousand marks annual quitrent. Wiclif took the side against its payment. This position placed him in more unfavorable light with the pope. Besides, in the course of this trial, he showed his determination to make the Holy Scripture the ultimate standard of all law. On account of this rejection by the pope his reformatory efforts have been attributed to personal revenge. Whether or not there is any truth in this hostile allegation can be judged only from a thoro understanding of his public conduct.

Probably in the year 1372 he received the degree of doctor of theology, after which he soon acquired a mighty influence by his lectures and writings, and daily took still stronger ground against the corruptions of the church.

HIS PATRIOTIC CAREER.

Previous to the year 1365 or 1366, Wiclif is only a quiet scholar and man of science. As fellow and seneschal of Merton College, as master of Balliol, as warden of Canterbury Hall, he had proved himself upright, circumspect, of energetic habits, and possessed of practical talent. His many-sided mind now began to participate in affairs of state, especially in defending the rights of the kingdom against the court of Rome. His works evince the warmest patriotism. He frequently recalls the memories of events in English history, and manifests the most immediate concern in the present condition of the nation and an earnestness for its welfare, liberties, and honor; besides, his philanthropic, cosmopolitan soul went out beyond his own little nation to the whole human race. Lechler has well expressed this attitude: "It is not wonderful that such a man—a churchman and highly regarded scholar on the one hand, and a thoro patriot on the other—rich in knowledge, full of insight, and inspired with zeal for the public good—should have been drawn into the career of a statesman and diplomatist. Yet he never lost himself in

purely political affairs; it was only on questions and measures of a mixed ecclesiastical and political kind that he gave his coöperation, and in the end his whole undivided strength was concentrated upon the ecclesiastical domain." (See Lechler, I, 196.)

Urban V, in 1365, as already mentioned, renewed the papal claim upon Edward III for an annual payment of one thousand marks as feudatory tribute, and also the payment of arrearages for thirty-three years. This tax was imposed upon the English crown in the reign of King John by Innocent III. It had been discontinued for a long time without remonstrance. At this juncture Edward III eagerly and wisely laid the claim before his parliament, expecting its repudiation, and with this the support of the kingdom in resisting papal demands. The spirit of patriotic nationality—then so far advanced by various circumstances—caused the "lords spiritual and temporal along with the commons" to unite in opposing the papal assumption upon the ground that King John had acted beyond his authority in subjecting the realm without its consent. Moreover, the lords and commons promised the king the support of the whole national resources, if needed, to defend the dignity of the crown. The papacy understood the meaning of such a spirit, and from that time to this, Rome has attempted no feudal superiority over England. In this resistance Wiclif took an important part. In answer to a vehement anonymous document aimed particularly at him from the papal side, he wrote a tract purporting to give the "*Views of Seven Lords in Parliament.*"

The first takes the ground that might is right, and therefore if the pope's claim is right he must sustain it by force.

The second, that a tax can only be paid to a person authorized to collect it, and the pope is simply a religious officer, and as such, in imitation of Christ, has no claim to worldly dominion.

The third, that taxes should be paid only for services rendered. The pope does not build up the realm either temporally or spiritually, but on the contrary appropriates its temporalities for the court at Rome.

The fourth, that instead of the king being the pope's vassal, the pope is the king's vassal, for the pope is only clerical lord over one-third of the lands, and thus his lordship must be less than that of the king, therefore he is vassal to the king; and since he has always neglected his duty as the king's vassal he has forfeited his rights.

The fifth, that the church has no right to take money for absolu-

tion, i. e., it ought not to practise simony. "Freely ye have received, freely give." (Matt. x, 8.) The nation ought not to suffer for the king's sins, for this would seem to be instigated by avarice or usurpation rather than justice.

The sixth, that if the pope had a legal right to make over the kingdom to John, he did very wrong to give away so much church property for so small an income, and thus he defrauded the church, and another might at his pleasure demand it back again under this pretense of previous fraud or bad bargain. "It is necessary then to oppose the first beginnings of this mischief, and we therefore hold our kingdom, as of old, immediately from Christ who is the Lord Paramount."

The seventh, that a hasty ill-considered treaty, brought on by the king's blame and without the people's sanction, cannot with constitutional right be allowed to operate mischievously.

These speeches are substantially embodied in the act of parliament of May, 1366, which sustained the position of King Edward. (Wiclif must have written this tract while he retained his position at the head of Canterbury Hall.)

At this point there is a break of six years in the documentary evidence concerning the life of Wiclif. The next we hear of him is his connection with an embassy of Edward III, in 1374, to treat with commissaries from Pope Gregory XI, at Bruges, concerning certain high offices in England given to Italians. The embassy holds plenary power to conclude such a treaty as shall "at once secure the honor of the church and uphold the rights of the English crown and realm." This was Wiclif's first absence from England, and here he must have had ample opportunity for cultivating acquaintance with Italian, Spanish, and French dignitaries of the church, and here too it was his privilege to take many observations among men noted for their devotion to the Romish court. Upon a mind so much given to observation as that of Wiclif, the striking difference in the degree of independence in principles and views of ecclesiastical law, between the Anglican and the Italian and Spanish churches, must have left impressions like those left upon Luther, at a later period, after his journey to Rome. At the head of the English embassy was the duke of Lancaster, John of Gaunt, second son of Edward III. In consequence of the ill health of his brother, the Black Prince, and of the age of the king, he was now the first person in the kingdom in the conduct of public affairs. Besides the advantages named, this visit

had important consequences in bringing Wiclif into nearer relations with this duke of Lancaster, whom a few years later we find as his public patron and protector.

The fact that the grievances of the "Good Parliament" of April, 1376, (of which Wiclif was a member) were louder and bolder than those before, proved that nothing of permanent value was accomplished in the negotiations at Bruges. And against the lukewarm reply of Edward III to their complaints came the renewed appeals of the parliament of 1377.

WICLIF AS A CHURCH REFORMER.

From this time the influence of Wiclif upon the nation was less widespread, yet it penetrated deeper into the hearts of the people. He had been promoted to the rectory of Lutterworth, in 1374, on which occasion he resigned at once his "living" at Ludgershall, a practise seldom followed, if we may judge from the instance of William of Wikeham, who had no less than twelve "livings" while at the same time he was serving as the king's private secretary, and could not attend to any in person. Against this practise Wiclif uttered strong invectives.

In 1377 he put forth a paper concerning the sworn obligations of the papal receiver, Garnier, the nuncio of Gregory XI, who was then collecting funds in England. This Garnier came with a train of servants and six horses. Before commencing his tour of the kingdom, he had, without the slightest scruple, taken an oath in which the interests of the crown and kingdom were protected on all sides. In this paper Wiclif accuses the pope's agent of perjury, in taking an oath not to violate the rights and interests of the country and at the same time collecting, in order to carry away, a large amount of gold. He also shows up the inconsistent action of the state in granting this permission and at the same time pretending to guard the interests of the country. In this tract the religious and moral, and even the evangelical, spirit of the man are equally strong with the national and patriotic. He emphasizes his remarks on the national welfare by asserting that its well-doing depends on the religious beneficence of its people, "particularly on pious foundations in behalf of the church and poor." But more characteristic of his stern conscientiousness is his expression with regard to the pope. In one of the parliamentary speeches mentioned it was declared that papal sin was possible, and here also he denounces the notion that every-

thing which the pope sees fit to do must be right and have the force of law; nor does he leave it with mere disapproval, but openly declares that the pope should be preëminently the follower of Christ in all moral virtues, especially humility, patience and brotherly love.

At this period, the political alliance of Wiclif with the duke of Lancaster party, together with his outspoken boldness on church reform, brought him twice in one year before spiritual tribunals. The duke determined to protect him, and on the 19th of February, 1377, when he appeared before the convocation in London, he was accompanied by the duke, grand marshal, and a band of armed men. This meeting terminated in a general uproar, and nothing was accomplished except an increase of hatred between the duke and the clergy. Meanwhile the episcopate was stirring up the see of Rome against Wiclif as an alleged teacher of heresy, and for this purpose they had collected and sent to Rome many of his doctrinal propositions. That the problem of how to trap him had been ripely considered, is evident from the fact that no less than five papal bulls against him were issued in one day. The first gives the archbishop of Canterbury and the bishop of London "apostolic commission and plenary power to ascertain by private inquiry whether the propositions contained in a schedule appended to the bull had been actually put forth by John Wiclif, and if this should be the case, to cause him to be put in prison and to be kept there until they should receive further instruction from the pope." The second appoints that in case of Wiclif's flight, the two prelates shall publicly cite him before Gregory XI within three months. The third requires them to bring before the king and others the condemned doctrines, and thus engage the secular powers against him. The fourth is directed to the king himself, commending his previous zeal for the Catholic faith and earnestly entreating his royal assistance. The fifth is to the chancellor of the university, in equally emphatic manner and accompanied with threats. The condemned articles were nineteen in number. They fall into three groups: (1) Concerning the rights of property and inheritance. (2) Concerning church property and its rightful secularization. (3) Concerning the power and necessary limits of church discipline.

Meanwhile, Edward III dies (June 21, 1377), the young Richard II is crowned, the French attack the southern coasts in August, the Scots assume a threatening aspect in the north, the regency is unsettled, the new parliament is anti-Roman and with the zeal of its

predecessor renews its complaints. Wiclif as acknowledged spokesman drew up an opinion for the young king and his great council. In this he takes a decided stand in favor of the lawful competency of the kingdom to hinder the treasure of the land from being carried off. He supports his view by appeals to the law of nature, to the scriptures, and to conscience. He cites attention to the objects for which this treasure is carried off, and to the ridicule to which Englishmen would be subjected in consequence of their "asinine stupidity."

After this parliament was prorogued, the prelates of London set about the execution of the papal order which they had judiciously deferred until a more opportune occasion. They now instructed the chancellor of the university to make the inquiries; and, if true, he was to cite Wiclif to appear within thirty days before the prelate in St. Paul's. It is noteworthy of Wiclif's standing that they do not conform to the instructions given, viz., to put him in prison; and so also is the entreating tone in which they address the chancellor, thus showing a possible doubt as to the good disposition of the university toward the papacy. And thus it turned out that the state of feeling at Oxford was entirely unfavorable to their project. In concurrence with the lothfully given summons of the chancellor, Wiclif appeared before the archbishop, not in St. Paul's, but at his palace in Lambeth. Demands from the nobles, however, instigated by the princess regent, and threats from the common people, caused him to go away as free as he came, with the simple exception that he was prohibited from delivering in lectures or sermons the questioned theses—but to this Wiclif did not himself agree. The affairs of the year had the effect of inflaming his earnest and free spirit to its full strength, and of bringing to light "how many hearts were beating in sympathy with him and his efforts." Then too, there occurred that great papal schism which caused to totter the little moral prestige that was left to the Romish church. Thus from the year 1378 we find Wiclif's attention devoted entirely to ecclesiastical matters, and thereafter he appears in the specific character of a church reformer.

[To be continued.]

THE BUSINESS RESULTS OF THE COLLEGE HERD.*

BY F. C. BURTIS.

PROBABLY, in reading over the program, when you came to the topic assigned to me, records of Jerseys, Guernseys, Holsteins or cows of phenomenal yields of butter and milk came to the minds of many of you, but I trust that you will not be disappointed when I relate to you an entirely different story. At present the college dairy herd consists of grade and mongrel cows, raised on the plains of Kansas under the great blue sky for shelter. This may seem like a remarkable herd for a college to have, but its like is not an uncommon thing on many farms of Kansas.

The purchase of this herd was brought about as follows: during the process of ridding the college farm of tuberculosis, in the fall of '97, all the stock, pure-breds, were disposed of. Altho the buildings were thoroly disinfected, it was not thought advisable to place high-priced stock in the buildings for some time to come. Our dairy school was to be started at once and milk would be needed for this. Common grade milk cows could furnish this article for a time, and their value would not involve any great risk under the conditions. Partly for the above reason it was decided to go out among the farmers and buy the common grade cows found on the average farm, and our herd is a representative of this class of cattle from the central part of the state. Don't understand that I have been making an apology for the existence of such a herd on the college farm, for under any conditions we would probably have purchased some such cows; but there was another very important thought we had in mind, and that was the ruling factor in deciding to purchase such a herd.

Records of pure breds, kept under fancy conditions, are numerous, but dairy records of the cows that are found on the majority of Kansas farms are very scarce, and few farmers can tell what are the profits in dairying with this class of cattle. They do not realize that half of them are not paying for the feed they eat. To many farmers all cows look alike as far as dairying is concerned; but what a surprise it would be to the average farmer if he knew that of the two cows standing side by side in his barn, one produced butter

* Paper read before the State Dairy Association at Topeka.

at seven cents per pound for the feed consumed while the other charges him fifteen cents. While his stock may not be of the most desirable type, he may be shown that an improvement on his method of feeding and care will give him much better results.

It should be demonstrated to him that by the proper selection of cows from this class of stock, the use of the right kind of a sire, and a further culling of the offspring, the profits of his herd can be doubled in a few years. To furnish information along this line with this class of stock was the one great object the College had in mind in purchasing our present herd. We have kept and will continue to keep a minute record of each individual as to feed consumed and milk and butter returns.

The cows from which I am to give you the records were purchased in Lincoln county, Kansas, and came from various farmers there. It is true better cows could have been found in the eastern part of the state, but very common cows there were held at \$40 to \$50. The very successful wheat crop in the West had to some extent dampened the enthusiasm for the cow, and thirty-two head were purchased there and laid down at Manhattan at an average cost of \$34 per head. In selecting these an effort was made to get cows approaching the dairy type at least, but nothing more than an average of the cows of that district was obtained, for many of the most desirable ones were held at prices out of our reach. I must confess they were a hard-looking lot when they reached the College, very thin in flesh; and from the condition of their coats, the barbed wire fences there are not very good shelter. They are mostly grade Shorthorns, the remainder being grade Holsteins and mongrels.

Before taking up the results of the work, I would say that soon after their arrival at the College all of these cows were subjected to the tuberculin test. Out of the thirty-two head, two responded and were slaughtered and found to have tuberculosis—rather surprising results for cows raised on the plains of Kansas.

The cows were purchased at two different times; twenty head reached the College January 5, and twelve head April 15. So for one bunch we have a record for 10 months and for the other a record of 6½ months. The work has yet only a good start and the results will be of much more value when they cover a couple of years, so my paper will be but a progress report.

The first thing that had to be done was to teach some of these cows to eat grain. Meal of any kind was a strange article to all of

them and likewise alfalfa, but a straw stack in the yard was made ready use of by them from the start.

Most of them were well on to a grain feed in a couple of weeks and doing well. For the first week the daily average milk yield per head was $15\frac{1}{2}$ pounds, and this was increased to 21 pounds for the second week. With a few exceptions given later the cows had all calved within a month or so previous to their purchase by the College.

As the cows were received at two different times, some months apart, it will be necessary in most cases to consider the results of each bunch separately.

Of the first twenty cows that were purchased, two were slaughtered. Six others were in calf when received, and dropped their calves from one to five months afterwards; hence, we shall be able to carry only twelve of them thru the total results.

In figuring out the cost of feeds consumed we had to settle the perplexing question that always arises as to just what prices to take for the feeds; the local market prices, or the average of several markets or the cost of raising to the farmer, etc. The following prices given are for Manhattan markets and in most cases represent what the College paid.

Corn meal.....	\$0.55 per cwt.
Kaffir corn meal.....	.55 " "
Linseed oil meal.....	1.25 " "
Soy bean meal.....	1.00 " "
Cotton seed meal.....	1.00 " "
Bran.....	.55 " "
Alfalfa.....	4.00 " ton
Ensilage.....	1.00 " "
Pasture.....	.75 " month

In most cases these are good stiff prices. To make the results more applicable to the average farm, we give the cows credit for the butter fat at a price paid each month at the Manhattan creamery, where, during a series of experiments, we delivered the largest part of our milk in summer time. The creamery returns the skim milk, which we credit at 90 % of the milk delivered, and place its value at 15 cents per hundred weight. In the results each cow should have the value of a calf to her credit; but this is not included here, as only the six mentioned came into the possession of the College.

The records for the first lot of cows purchased will cover a period from January 5 to November 1, and will include twelve cows. At the start they were put on a grain ration consisting of a mixture of

two-thirds bran and one-third linseed meal, and alfalfa for roughage. This was a narrow ration designed to start a good flow of milk at once, and it did the work well. Next they were put on a ration of Kaffir corn meal and alfalfa for seven weeks. Following this for a couple of weeks the grain ration was a mixture of Kaffir corn meal and soy bean meal in equal parts, and Kaffir corn stover for roughage. A grain mixture of one-third ground oats, one-third bran and one-third corn meal along with alfalfa and stover followed the above for a period of three weeks. Following this until spring the grain consisted of varying mixtures of soy bean meal, cotton seed meal, bran and corn meal and alfalfa for roughage. Early in May silage was added to their feed. The cows were not turned out to pasture until the first of June. Soon after this the grain was changed to a mixture of four parts corn meal and one part bran. Up to this time the daily grain ration per cow had been 8 pounds per day for all except a few. At times it had been raised to 10 pounds; but the returns did not justify the increase. A daily grain feed of 3 pounds per cow was continued thru the summer, and the alfalfa continued in varying amounts to suit the condition of the pasture, and at times as high as 15 pounds per head was eaten.

During the period of a little less than ten months the milk yield for the twelve cows was 60,170 pounds, which contained an average of 3.97% butter fat or 2,451 pounds. In round numbers, for the production of this milk the twelve cows consumed 24,000 pounds of grain, 29 tons of alfalfa and Kaffir corn stover together, and 18 tons of silage and were 6 months on pasture, which at our figures makes the cost \$289.

At Manhattan creamery prices the butter fat would have a value of \$381, which gives a balance of \$92 over the cost of the feed. The skim milk at 15 cents per hundred weight would amount to \$81; but deducting the hauling at 10 cents per hundred from this leaves \$21, or a total net return of \$113, being a little over \$11 per month. The average daily yield of milk per cow would be $16\frac{3}{4}$ pounds and would contain 0.68 of a pound of butter fat. While the average results are quite low, when compared with good dairy cows, several of these individuals gave much better results, and one cow gave phenomenal results for a grade cow. Her daily average for 299 days was $27\frac{1}{2}$ pounds of milk and 1.07 pounds butter fat. Omitting the record of this cow and taking the results of the next best two cows of the twelve, we find if the bunch had averaged as good as these two, the

net results would have been \$179 instead of \$113, or a gain of \$66. Those two cows gave an average daily yield of 19.9 pounds of milk and 0.83 of a pound of butter fat. Hundreds of herds are being milked in Kansas, the results of which will not average any better than these two cows, when, if records were kept and the culling process carried on, they could be made to equal as good results as the two cows cited above. The feed consumed by the poorest cow of the twelve cost some two dollars more than the returns of the butter fat.

The flow of milk was at its highest point in March, when the daily average was a little over 20 pounds, and this had decreased to 13½ pounds in October. This is very good for this class of cows when we consider that they have been giving milk 10 months or over. The greater part of them have not been successfully bred until within the last month. At the present time three are giving considerably less than a gallon of milk a day, but some are holding up the yield remarkably well.

The results during the periods of different feeds are interesting, but time will allow taking up only one or two of them here. The most successful period, financially and otherwise, was the one where Kaffir corn meal was fed for grain and alfalfa for roughage. Here the proper proportion of grain and roughage were readily eaten and a balanced ration maintained on 10 pounds of the meal and 18 pounds of alfalfa. A pound of butter fat was produced at a cost of 11½ cents.

The soy bean meal and Kaffir corn meal made a very good milk ration, but in the half and half proportion the butter was very soft. This was partly caused by the cows refusing to eat more than three or four pounds of the Kaffir corn stover a day that was furnished for roughage. If this had been eaten in proper amount it would have partly corrected the softness of the butter.

For the second lot of cows purchased we have the following results, which cover a period from April 15 to November 1. After becoming accustomed to grain they were put on a mixture of five parts corn meal, three parts bran and two parts cotton seed meal. For a time they were fed ten pounds of this mixture a day. Besides each cow ate about 35 pounds of corn ensilage and 15 pounds of alfalfa. This readily brought the milk yield up to 20 pounds a day and the grain feed was reduced to 8 pounds per day in a couple of weeks. June 1 they were turned out to pasture with the other cows, and the grain changed to a mixture of four parts corn meal and one part bran. The grain feed was reduced to 3 pounds a day for the

summer. They were also fed alfalfa, and had access to wheat pasture with the others during October.

During this period of $6\frac{1}{2}$ months the milk yield for the twelve head was 40,226 pounds, containing an average of 3.87% butter fat or 1559 pounds. Roughly this is about 16 pounds of milk, or 0.6 of a pound of butter fat per day for each cow.

Figured at the same prices used with the former cows, the total butter fat has a value of \$232.95. The total amount of feed eaten, 13,386 pounds of grain, $25\frac{1}{4}$ tons of ensilage, $14\frac{1}{2}$ tons of alfalfa and Kaffir corn stover, and 6 months of pasture, cost \$210.43, making a balance of \$22.52 in favor of the receipts for the butter fat over the cost of feed.

After deducting the cost of hauling from the value of the skim milk, there is a balance of \$14, or a total balance of \$36.51 for the $6\frac{1}{2}$ months, or about \$5.50 per month. Not a very encouraging showing. Again, while the average is poor, some of the individuals made very creditable showings. For instance, during the period the best two cows gave 9,424 pounds of milk which contained 334 pounds of butter fat. This would be an average daily milk yield of about $23\frac{1}{2}$ pounds and 0.84 of a pound of butter fat per cow; a very common yield among good cows; but if the twelve head had averaged as well, the total balance of returns over the expenditures would have been \$100, instead of \$36.52 as it actually was.

At the close of October, four of the cows were giving less than half a gallon of milk each per day, and they will be dry in a short time. None of them will be fresh for from six to eight months. This shrinkage has taken place under good feed and care, and illustrates the inherited trait that these cows have to go dry six to eight months in the year.

Altho these results cover only a part of a season's work, some valuable points have already been brought out. The grain feed and alfalfa were continued thru the summer, partly to prepare the cows for another season's work, but from the results of the past summer we obtained a valuable lesson. From July 5 to August 16 the milk yield of the college herd shrank $4\frac{1}{2}\%$, while that of eight herds belonging to farmers and kept on pasture without grain shrank 39%. This was during a dry spell that materially affected the pastures. In considering the results for this part of a season it should be borne in mind that these cows have had hardly time to recover from a rough journey on the cars at a critical time and have been recuper-

ating from the effects of years of misusage. It will take a year or two to tell how completely they can recover.

But above all other results stands out the great variation in individual results, and years are not likely to change these much. To illustrate, for all the cows the butter fat costs an average of 12.65 cents per pound, with the best cow $8\frac{1}{3}$ cents, with the best five cows 9.9 cents, with the poorest five 16 cents, and with the poorest individual 21 cents.

I regret that I am unable to show you pictures of some of these individuals that would further demonstrate the fact that to the degree a cow approaches the true dairy form she becomes a paying cow. These individual variations are marked and important, and clearly point out the methods to be employed to improve our Kansas dairy herds. Cull out the poor cows and the farmer's profits in the dairy industry of Kansas will be increased many fold.



CELERY.

(Press Bulletin No. 11. Department of Horticulture and Entomology. Kansas Experiment Station, Manhattan, Kansas.)

CELERY is one of the most palatable vegetables to be found on American tables. Its cleanness, brightness and crispness, together with its delightful odor and flavor, are the qualities that make it welcome and that have caused the demand for it to increase more rapidly than the supply.

Its culture has, however, spread rapidly in recent years as a variety of soils has been found upon which its production is certain and very profitable. At the present time there is scarcely a town of any size in our state whose gardeners do not include celery among market crops, while it has also found an honored place in many family gardens.

During the last four years celery has been grown as an experimental crop at this station. Its culture has become more successful as better methods have been worked out and adapted. Our work with the crop during the past season has been attended with marked

success. From the results obtained at this station and from data collected in various portions of the state, we feel confident in making the following cultural observations:

OBTAINING PLANTS.—Home-grown plants have given better results than those obtained from commercial growers. Fresh seed should be sown in rich soil in hot-bed or cold frame about April 1. Rows should be six inches apart and the seed covered to a depth of one-eighth inch. Firm the earth over the seed and shade lightly. Water to keep the soil moist but not wet. Regulate temperature of the frame at from 60° to 70°. When the plants are two or three inches high they should be transplanted into other beds or else thinned and sheared off, in order to make them strong and stocky. Plants should be well hardened off before transplanting into the field.

LOCATION.—The best location for celery is a moist, cool spot of rich loamy soil, protected from the wind and suitable for irrigation if possible. Enrich the soil heavily with well-rotted stable manure early in the spring. Give deep plowing and cultivate thoroly, in order to have the ground mellow at the time of transplanting.

TRANSPLANTING.—Several methods are in practise. Setting plants in trenches, in furrows, on the sides of furrows and on the level surface are methods employed by various growers. Our best success has been attained in the following way: Mark off rows four feet apart and furrow with stirring plow, turning the ridges in the same direction. Set the plants six inches apart on the side of the furrow next the ridge and a little above the bottom. In subsequent cultivation keep the furrow open and use it as a ditch in irrigating.

CULTIVATION AND BLEACHING.—Thoro cultivation should be the rule from the start. Permit no weeds to grow. If irrigation is practised, the ground should be cultivated after each application of water. When the plants have attained the proper size for use, the leaves are brought into an upright position by boards placed on either side of the row, so that they slope toward the plants at the top, or else by dirt drawn against the plants and packed firmly around them. The object of this is to cause the leaves to take an upright position and exclude the light from the heart of the plant, so that the later growth is white or "bleached." The process of bleaching requires from two to four weeks, depending upon the variety and time of the year.

DIGGING AND STORING.—After the bleaching process is carried as far as desired, the plants are dug. For early celery, this may be in September or October, but the late crop should not be taken up until there is danger from freezing. The plants are usually lifted with a spade or potato fork, and the decayed outer leaves removed. They are then ready for storing. This may be done in a damp, cool cellar, or in trenches outside. If in the cellar, the roots should be bedded in moist sand or earth, leaving the plant to stand upright. Boards should be put in every eight or ten inches to separate the plants and allow ventilation. When the crop is stored outside, trenches are dug eight inches wide and deep enough to allow the tops to be even with the surface of the ground. For a cover, nail two boards together, making a trough. Set this over the tops and spread on a light covering of hay. As cold weather increases, cover with earth to avoid all possibility of freezing. If sound when stored, celery treated in this way should keep until February.

VARIETIES.—We have as yet found nothing better than such well-known varieties as Dwarf Golden Heart, Golden Self-Blanching, and White Plume.

There is no royal road to success in celery-growing; but painstaking, watchful efforts have been and will be successful whenever put forth. We are hoping for the increase of such efforts among gardeners and farmers in the business of celery-growing.



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THE INDUSTRIALIST.

Published ten times per year by the Printing Department.

KANSAS STATE
AGRICULTURAL COLLEGE.

Manhattan, Kansas.



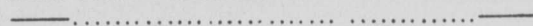
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SOME APPLICATIONS OF MODERN GEOMETRY IN MECHANICS.

BY ARNOLD EMCH.

II. Pole and Polar Plane.

IN the November number of THE INDUSTRIALIST I have treated the statics of a linkwork whose foundation consists in the important principle of geometrical inversion. The purpose of this paper is to give a brief theory of polar systems and their mechanical meaning. As is well known, a polar system is a special case of reciprocity in space and expresses a dual or reciprocal correspondence between figures in space. To every plane corresponds a pole situated in the same plane, and to all planes passing thru a point correspond poles which are all situated on the polar plane of that point. Möbius,¹ who discovered this system, called the pole *Nullpunkt* and its polar plane *Nullebene* and the correspondence itself *Nullsystem*. The last term is also frequently used in English treatises.

In the theory of partial differential equations the reciprocal correspondence between pole and polar plane is expressed by the Pfaffian differential equation:²

$$A(ygz-fdy)+B(fdz-xdz)+C(xdy-ydx)+Ddx+Edy+Gdz=0,$$

in which A, B, C, D, E, G are constants.

By projective transformations this equation may be transformed into the well-known equation

$$xdy-ydx+dz=0.$$

Among the integral curves of the Pfaffian equation there are ∞^2 straight lines

$$x=rz+c, y=sz+b,$$

¹ Möbius, Über eine besondere Art dualer Verhältnisse zwischen Figuren im Raume, in vol. x of Crelles Journal, Berlin, or in vol. I. p. 499, Gesammelte Werke, Leipzig, 1883.

² See Sophus Lie, Geometrie der Berührungs Transformationen, vol. I. p. 206.

which generally satisfy the condition

$$sc - rb - 1 = 0.$$

These lines form a linear complex and are the rays reciprocal to themselves in the *Nullsystem*.

2. The connection between this system and the composition of forces in space will now appear from the following considerations. If a system of forces in space is given it may generally be represented in an infinite number of ways by either two forces not in the same plane, or by a single force and a couple of forces. To prove the first part of this statement, assume any plane E and produce the given forces P_1, P_2, P_3, \dots till they intersect this plane in the points A_1, A_2, A_3, \dots respectively. Choose any point O without the plane E and connect the points A_1, A_2, A_3, \dots with O . Resolve every given force, P_n , into two components of which one, R_n , is directed towards O , and the other, E_n , is situated in the plane E . Now all the forces R_1, R_2, R_3, \dots thru O can be combined to a single resultant R , and in a similar manner the forces E_1, E_2, E_3, \dots in E can be combined to a single resultant S in the plane E . Thus the given system of forces is reduced to two forces, R and S , q. e. d. To each point in space correspond ∞^3 resultants, R and S , according to the ∞^3 planes E of space, and to each plane correspond also ∞^3 resultants S and R , according to the ∞^3 points O of space. The system of given forces may be of such a nature that two corresponding resultants, R and S , lie in the same plane, in which case the whole system reduces to a single resultant. The case may also occur where R and S form a couple. The second part of the previous statement may be proved by assuming any point O in space and drawing parallel and equal forces P_1', P_2', P_3', \dots , and of the same directions, to the given forces P_1, P_2, P_3, \dots thru O . Adding to these forces equal forces $P_1'', P_2'', P_3'', \dots$ thru O , but in opposite directions, the effect of the system will not be changed. Now every force P_n'' with its corresponding force P_n of the given system forms a couple. The resultant of all these couples $(P_1 P_1''), (P_2 P_2''), (P_3 P_3''), \dots$ is a single couple $(P P'')$, and the resultant of the forces P_1', P_2', P_3', \dots is a single force P' . The original system is now reduced to a couple and a single force, q. e. d. As there are ∞^3 points in space, this reduction may be effected ∞^3 times. The forces P_1', P_2', P_3', \dots are the same for every point O of space. Hence the resultant P' of these forces does not

change its magnitude and direction. The couple of forces, however, changes from point to point.

3. The system of the infinite number of intersecting lines of the resultants, R and S , into which a number of forces in space may be reduced, forms a linear complex which is identical with the reciprocity and duality of pole and polar plane. Considering two corresponding resultants, R and S , any point on R may be considered as a pole, and the plane passing thru it and thru the other force, S , as the corresponding *polar plane*. Möbius called pole and polar plane "zero-point" (Nullpunkt) and "zero-plane" (Nullebene), respectively, on account of their effect upon the moments of the system. The moment of the forces with regard to each straight line which passes thru a pole and which is situated in the corresponding polar plane is zero. In fact, the moment of the system of forces vanishes with regard to every straight line which intersects two corresponding resultants of the system. These lines for which the moments of the system vanish are the rays of the linear complex. From this the theorem follows:

Every ray which intersects three forces of two pairs of corresponding resultants of a system of forces intersects also the fourth. Two pairs of corresponding resultants are always situated on a hyperboloid of one sheet.

Let R_1 , S_1 and R_2 , S_2 represent two pairs of corresponding resultants and g a ray of the complex which intersects the forces in the points A_1 , B_1 and A_2 , B_2 , respectively (fig. 1). The polar plane of A_1 passes thru S_1 and intersects S_2 in the point B_2 . The polar plane of B_2 passes thru R_2 and intersects R_1 in the point A_1 . This gives the theorem:

If a point lies in the polar plane of a second point, the latter lies in the polar plane of the former; and conversely—

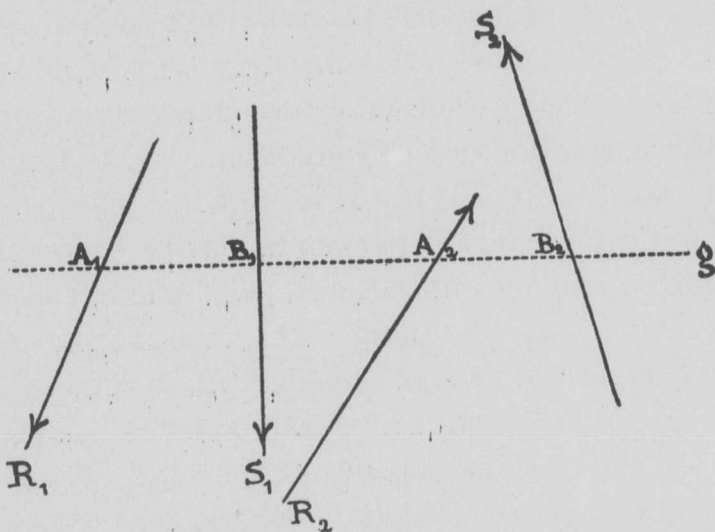


FIG. 1.

If a plane passes thru the pole of a second plane, the latter passes thru the pole of the former.

As a consequence the corollaries may be stated:

The poles of all planes passing thru a fixed point lie in the polar plane of this point. The polar planes of all points of a fixed plane pass thru the pole of the latter.

In the correspondence of pole and polar plane two corresponding resultants are called two reciprocal straight lines. Taking any straight line of space as the direction and position of a resultant, the poles of all planes passing thru it lie in a straight line, which, according to the definition of pole and polar plane, coincides with the corresponding resultant. Therefore, the rays, intersecting pairs of resultants, are reciprocal to themselves.

4. In the reduction of a system of forces into two resultants, R and S , we may assume the plane at infinity as the plane E . In this case the resultant S in E becomes infinitely small and the resultant R remains constant and has the same direction for every point O of space. It is known, however, that an infinitely small force at infinity has the same effect as a couple of forces. From this point of view, the reduction of a system of forces into a force and a couple of forces appears as a special case of the first method, in which every system is reduced to two resultant forces.

The direction of the infinitely distant and small force may also be found as the direction of the plane containing the couple of forces in the second method of reduction. This direction is generally oblique to the direction of the resultant R . There is a certain case in which both directions are perpendicular to each other. In the reciprocal correspondence of pole and polar plane, these facts are obtained by the following reasoning: If a straight line is situated in a plane a , its reciprocal straight line will pass thru the pole A of a . Hence, the locus of the poles of all parallel planes is a straight line which passes thru the pole of the plane at infinity. This is true of all pencils of parallel planes. Such lines, whose reciprocals lie at infinity, are called *diameters* of the complex¹. As they pass thru the pole of the infinitely distant plane, they are all parallel. This corresponds to the second method of reduction, by which every system of forces is reduced to a resultant and a couple of forces. All these resultants

¹ See Cremona, Graphical Statics, p. 127.

for different points of space are parallel, and the couples of forces may be considered as infinitely distant and small forces.

The poles of all planes perpendicular to these diameters lie in a straight line which is one of the diameters and which is called *central axis* of the complex, or of the system of forces. The central axis is reciprocal to the line at infinity which is common to all planes perpendicular to the central axis, and which passes thru the pole of the plane at infinity. Any pair of corresponding resultants, or of reciprocal straight lines, the central axis and its reciprocal line at infinity, lie on an orthogonal hyperbolic paraboloid.

It is therefore clear that the common perpendicular of two reciprocal straight lines cuts the central axis perpendicularly. With this fact as a base it is easy to construct the central axis, if two pairs of reciprocal straight lines are known. Construct their common perpendiculars p and p' . The common perpendicular of p and p' is the central axis. Two reciprocal rays intersect the plane at infinity in two points. The ray joining these points is reciprocal to itself and passes thru the pole of the plane at infinity, i. e., thru the intersection of the central axis with the plane at infinity. A pair of reciprocal rays and the central axis are therefore always parallel to a certain plane, and the projections of two reciprocal straight lines upon a plane which is perpendicular to the central axis become necessarily parallel.

5. If a system of forces has been reduced to a single force and a couple, it is always possible to resolve the couple into two components, the plane of one being parallel, of the other perpendicular, to the force. In fig. 2, R represents the single force and $(P\ Q)$ the couple: $(P'\ Q')$ represent the component couple in a plane parallel to R , and $(P''\ Q'')$ the couple in a plane perpendicular to it. The line joining the points of application of P and Q is supposed to be perpendicular to R . The first couple, when compounded with the force, merely shifts the line in which it acts and does not change its magnitude. Thus, a system of forces may be reduced to a single

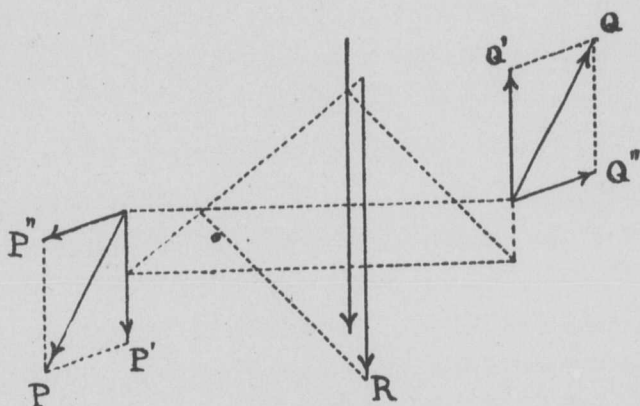


FIG. 2.

AE and AF=R. By this operation the two forces AD and BC are reduced to a single force, R, and a couple (BC, AE) whose moment may be represented by a distance $AM=BC.a=m$, perpendicular to the plane of the couple. Now the volume of the pyramid is

$$V = \frac{a}{2} \cdot BC \cdot \frac{h}{3} = \frac{1}{6} ah \cdot BC.$$

But from the figure $h = R \cos w$, hence

$$V = \frac{1}{6} a \cdot BC \cdot \cos w \cdot R.$$

The expression $a \cdot BC \cdot \cos w = m \cos w$ gives the moment of the couple belonging to the central axis. Designating this constant moment by n , there is

$$V = \frac{1}{6} n \cdot R = \text{const.}$$

q. e. d..

RECIPROCAL FIGURES.

6. In the preface of Cremona's Graphical Statics, the remarkable statement is made:

At a time when it was the general opinion that problems of engineering could be solved by mathematical analysis only, Culmann's genius suddenly created graphical statics, and revealed how many applications graphical methods and the theory of modern (projective) geometry possessed. No section of graphical statics is more brilliant, or shows more effectually the services that geometry is able to render to mechanics, than the one dealing with reciprocal figures and framed structures with constant load.

The theory of reciprocal figures follows in a natural way from the correspondence of pole and polar plane. It has been seen that to every plane corresponds a point in this plane, and to every point a plane passing thru this point. The polar planes of any two points of a straight line intersect each other in its reciprocal straight line. Thus, to the vertices of a polyhedron ABCD. . . correspond the faces $a' b' c' d'$. . . of a second polyhedron which pass thru the vertices of the first, respectively, and to the faces $a b c d$. . . of the first correspond the vertices $A' B' C' D'$. . . of the second which are situated in the faces of the first, respectively. To the edges of the first correspond the edges of the second, respectively. In this manner two polyhedrons are obtained which are mutually inscribed and circumscribed to each other. To the edges departing from the vertex of one polyhedron correspond the edges of a polygonal face of the other.

The two polyhedrons may now be projected upon a plane perpendicular to the central axis. Two plane figures are obtained which are reciprocal in the sense of graphical statics. The sides of one figure are respectively parallel to the sides of the other figure. But this correspondence is not similarity. To three sides of the first figure forming a triangle correspond three sides of the second figure passing thru the same point.

In fig. 4 the corresponding sides of the two reciprocal figures are marked by the same numbers and letters. They may evidently be

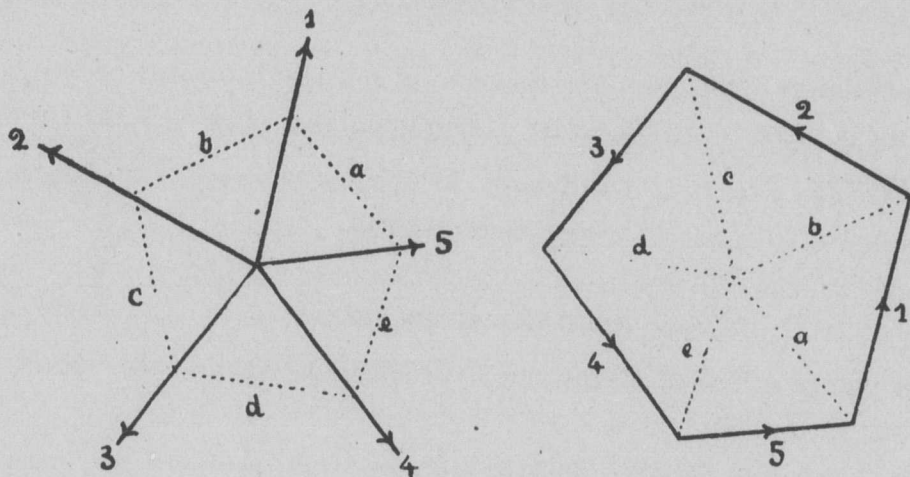


FIG. 4.

considered as the projections of two pentagonal pyramids, which may be put into a position as required by the correspondence of pole and polar plane. In the left side figure the sides a , 1 , b meet in a point, while on the right side a triangle is formed by them.

Considering the sides $1, 2, 3, 4, 5$ as forces, the figure to the right represents a polygon of forces, while the figure on the left represents the true position of these forces and their funicular polygon. According to the figure the five forces are in equilibrium. The same result holds for any number of forces passing thru a point and given in a general way. The previous figure does not alter by considering -5 as the resultant of the forces $1, 2, 3, 4$. Hence the theorem may be stated:

The polygon of forces and the funicular polygon of a system of forces passing thru a fixed point and being in a plane form two reciprocal figures.¹

This theorem may be generalized at once. It holds for any system

¹The first clear statement of this fact and its deduction from the "Nullsystem" has been made by Cremona; see loc. cit.

of forces in a plane and of a general position. Assume, for instance, three forces 1, 2, 3, in a plane, and in a general position, and construct the polygon of forces and the funicular polygon for any two poles O and O' . From fig. 5 it is seen that the polygon of forces 1 2 3

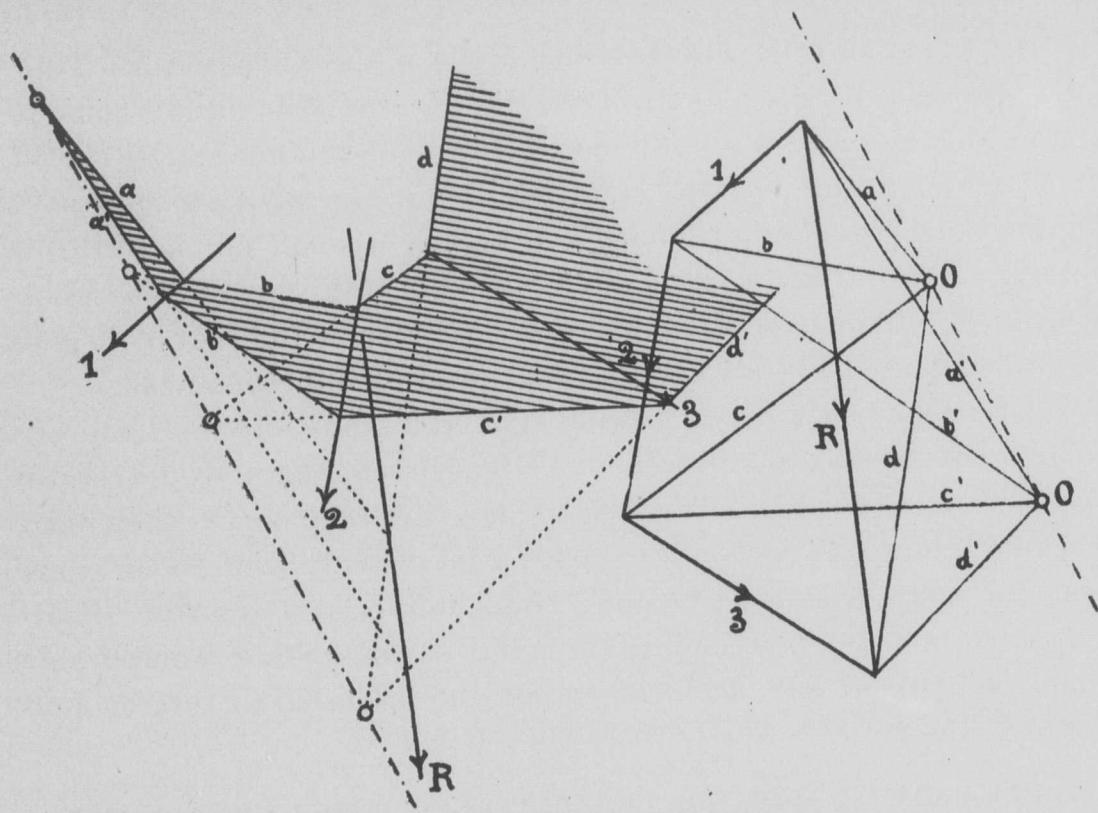


FIG. 5.

R , $a b c d$, $a' b' c' d'$ on the right side may be considered as the projection of two pyramids having the same base 1 2 3 R , and O and O' as vertices, respectively. The forces and the funicular polygons on the left side are the projection of the polyhedron corresponding to the two pyramids. To the vertices O and O' correspond two planes and to the edge a, b, c, d , and a', b', c', d' , of the two pyramids the sides of two polygons (funicular polygons) in those planes. To the line joining O with O' corresponds the line of intersection of the two planes. The two figures representing polygon of forces and funicular polygons are therefore reciprocal. From this interpretation the theorem is obtained:

Corresponding sides of any two funicular polygons of the same system of forces in a plane intersect each other in points of the same straight line.

This theorem is of the greatest importance in Culmann's methods. In the case that the given forces pass thru the same point, the two funicular polygons are collinear in a perspective collineation.

STATISTICS BY THE STATE TEMPERANCE UNION.

BY WILLIAM CANFIELD LEE.

THE writer of this article is a member of the Kansas State Temperance Union; he receives the *Kansas Issue*, and reads it. In the November number the eye is met by a striking article on the first page, pointing out that in buying liquor the laboring man pays for the services of other laboring men only a small per cent of his outlay. In every \$800 spent for liquor only \$9.84 goes to the laborers who join their hands to make that liquor; and the rest of it goes as profits to men who sit in their chairs and own the business.

This is taken as a strong reason against a trade in which there is such a division of the proceeds. The working man would better spend his hard earned dollars where they will help some other hard-working fellow and not simply enrich a lot of puffy lager beer brewers. Is this a sound argument? Think before you answer. Probably most of my fellow members in the Kansas State Temperance Union will say it is. Well, let us look at the table in full, as published in the *Issue*.

TABLE SHOWING HOW THE LIQUOR TRAFFIC ROBS LABORING MEN.

In every \$100 worth of

boots and shoes you buy is \$20.71 of labor.

furniture you buy is \$23.77 of labor.

hardware you buy is \$24.17 of labor.

clothing you buy is 17.42 of labor.

cotton goods you buy is \$16.91 of labor.

men's furnishing goods you buy is \$18.34 of labor.

worsted goods you buy is \$13.55 of labor.

woolen goods you buy is \$12.86 of labor.

In the above goods, in each \$800 lot, is \$147.73 labor employed.

In every \$800 worth of liquors you buy is \$9.84 labor.

Now you will observe that the article points out that in buying \$100 worth of woolen goods we pay only about one-eighth of that sum for labor; and in buying \$100 worth of hardware, in which the labor element is largest, we still pay only about one-fourth of the money for that part of the cost. Let us take the average. "In the above goods, in each \$800 lot, is \$147.73 labor employed," which is 18.47%, or less than one-fifth. Does not the same argument apply?

Remember the argument against liquor in this particular appeal

is not the harmfulness of the liquor, but the fact that the proceeds from its sale do not go to the laborers whose work produces the commodity, but to men who by having charge of the business get possession of the biggest part of what is made out of the business. In other words, what workingmen pay, other workingmen do not get; whereas the common theory is that what every class as well as every individual pays out and what it receives in return must be equivalent. But we see that workingmen pay \$800 for boots, furniture, hardware, etc., yet receive only \$147.73 for making these commodities.

In other words, every laboring man works to make goods of full value, but is paid only a small part of that value. If this were true of only exceptional individuals here and there, it would not be very significant. But the *Kansas Issue* shows that it is true, on the average, for all the men engaged in these eight important departments of commerce, and doubtless it is true in others generally. Now I am not charging anyone with robbing the laborer; yet we must admit that here is a waste of toil. If most people (laborers are most people) cannot get back as much as they turn out, much that is turned out will not be used up. So there is overproduction—not due to a panic, nor inflation, nor booms, but to a settled condition in the way we do business.

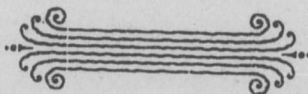
Further, if for the majority of the members of society it is impossible for a man to get back and use up as much as he turns out, it is impossible for him to have the use of all the things for comfort, enjoyment or upward progress which the brains and muscles given him by the Almighty enable him to create.

Now if every sober man is comfortably off, as temperance workers tell us, it follows that these sober men, enjoying the use of only about one-fifth of what they make, are really five times as capable as they appear to be if we judge them by their condition in life. The requirements of sobriety, industry, thrift, and the other "homely virtues" of which we have heard from childhood are after all only one-fifth rewarded. Is not that rather discouraging for the man who resists every temptation to waste his money in pleasure, and who is thrifty from his youth up, in order to get ahead?

Yet after all, there are many poor creatures who are by no means five times as bright as the average laborer's deceptively modest appearance. They are not bright at all. They are in very truth unable to earn a comfortable living, and must be helped by charity.

Are these feeble folk separated by a wide gulf from the next grade of character above them? In one class we have the incapables, and in the very next, we step away up to the capable fellow who, if he would only keep sober, could produce so much as to suffer the loss of four-fifths of it and still have an abundance to satisfy all his common needs. Is it true that there is such a gap? No, there is a gradual rise. Everyone is so close to the next one above and the next one below him in ability as to be apparently the equal of either. Well, then, it is evident that for four-fifths of the distance, between the man who cannot support himself at all and the man who does support himself in comfort, there are people who would be comfortable if they could get back all they turn out, but who in fact are suffering for lack of that part which they do not get back. The boot and shoe maker suffers for lack of \$78.29 when he receives only \$20.71 out of \$100 worth of boots and shoes. When \$100 worth of woolen goods are sold, the sheep shearers, the woolen yarn spinners, the weavers and the seamstresses who make up the same into garments, all these if they are not living in comfort are suffering for lack of the \$87.14 on the average which they turn out but do not get back.

If it be said that the \$87.14 is for material, and they do not furnish the material, then I ask, who does furnish it? Does not God? It is all labor except the material, which God furnishes. Yet there is only \$12.86 of labor in that \$100 (and this estimate is true, for the State Temperance Union would not print false statistics in the *Kansas Issue*)—all the labor that has been put on it since God furnished the material. The \$87.14 he gave to his children without charge, free as air. How does it come that these eight laboring men the *Issue* tells about have to pay for it?



DEDICATION OF THE DOMESTIC SCIENCE HALL.

ON Friday, January 6, occurred the dedication of the Domestic Science Hall of the Kansas State Agricultural College. The building was erected and equipped from the appropriation of \$16,000 made by the last state legislature. This building is one of the very few devoted exclusively to the work of education in the lines of the arts and sciences of the home.

The afternoon exercises occurred in the college chapel which was comfortably filled. The exercises were opened with music by the college orchestra. A paper, "The Industrial Education of Women," was read by Miss Minnie A. Stoner, professor of domestic science in the College. Miss Edith Huntress followed with a vocal solo entitled "It is All for You." President Albert R. Taylor, of the Kansas State Normal, followed with an address on "Education for Life." His remarks were replete with wit, humor, and sound pedagogics. President Taylor was succeeded by the college orchestra in "From Dawn to Twilight." The closing address of the afternoon was delivered by Chancellor George E. MacLean, of the State University of Nebraska, at Lincoln, his subject being "The Comity of Colleges." This stirring address aroused the enthusiasm of all present, not only for education but for such a fellowship between colleges and universities, regardless of state lines, as sometimes exists between the different branches of a religious or fraternal order. The afternoon exercises closed with a vocal solo by Miss C. Jeanette Perry, entitled "Mamma's Love Song."

Friendly greetings, introductions, conversation, and the visiting of different college buildings followed. At six o'clock the invited guests assembled at Domestic Science Hall and were introduced to the reception committee. At 6:30 they descended to the dining room where the banquet had been prepared. Following the banquet came the toasts given in the study and class room on the main floor, which for the occasion had been thrown into one. Regent J. N. Limbocker, president of the board, first spoke of the "History of the Construction of the Building." Prof. J. D. Walters, senior member of the college faculty, followed in response to the toast, "The House that Jack Built," sketching the history of the growth of domestic science teaching in the institution. Former Regent Secrest

combined wit and wisdom in his discussion of "The Farmer's Dinner." Regent Hoffman gave his answer to the question whether "Civilized Man Can Live Without Cooks," convincing all present that such a life is impossible. Hon. Edwin Taylor treated loftily the theme "To Rear a Wall of Men." Regent Carl Vrooman made his debut before an Agricultural College audience by giving his "First Impressions of the Kansas State Agricultural College," and justified therein his wide reputation for eloquent and dignified speech. Letters of congratulation sent by Mr. L. R. Elliott, Pres. L. H. Murlin of Baker University, and Prof. S. W. Williston of the Kansas State University were read. Mrs. Annie L. Diggs closed the toasts and addresses for the evening with some noble thoughts on the "Higher Education of Women." A competent judge declared that the toasts reached and maintained the highest level he had ever witnessed on such an occasion.

Music was plentifully interspersed. Selections by the Wagner Symphony Club; a violin duet by Messrs. B. R. Brown and T. L. Hoffman; a trio, violins and cello, by Messrs. R. H. Brown, A. D. Brown and T. L. Hoffman; a vocal solo by Miss Marie Haulenbeck; and a violin duet by Messrs. R. H. Brown and B. R. Brown constituted the leading features.

Much credit is due the Musical department of the College for the abundance and high grade of its contributions. Altogether the occasion was a pronounced success, a time of first meetings, reunions and good fellowship, marked by renewed interest in industrial and especially domestic education and training, by intellectual awakening, and an uplift towards the larger and fuller life.

The first address of the afternoon was by Miss Minnie A. Stoner, professor of household economics, on the subject, "The Industrial Education of Women." Only a synopsis of Miss Stoner's speech will be given here, and the whole will appear later as an article in THE INDUSTRIALIST.

The strongest test of what this work can do is what it has done and what it offers for the future. In the eastern, northern, and western states of our country industrial education has been given various tests. The new south has made a remarkable advance in industrial training. What is done for the boy in agriculture and engineering must be done for the girl in domestic science and art. Recent improved methods need to be applied in schools where the subject has long been taught in an elementary form. In colleges more extensive work ought to be given.

The secretary of agriculture in his report for 1897 condemns the

old methods, under which the work consisted of teaching how to make particular dishes, and he urges putting this subject on the basis of an applied science, as is done with medicine, engineering and agriculture.

Extracts are given from the examination papers of the post-graduate and senior students showing what has come to them in the way of new views from their study under the scientific method.

PRESIDENT TAYLOR.

Albert R. Taylor, president of the State Normal School, spoke on "Education for Life." He said in substance:

There are two kinds of education and there has been much conflict as to which is the true kind. There is that whose aim is the development of the faculties; it is not the knowledge of any special thing as needful, but simply the development, by study and drill, of the power to do and to understand. The aim of the other is to prepare the student for practical life; mere general culture is insufficient; the result should be to enable the student to take his place in the environment where he will pass his life and deal with the forces there found. Neither of these alone is the true aim of education. Both are narrow. The aim of education is to prepare for life. Then the question is, what is life? [Here the speaker enumerated many of the activities, in business and pleasure, in which various kinds of people engage, and asked of these each and all, Is this life? Then he mentioned his own ideals at the ages of five, ten and fifteen years. When he was a lad, his highest ambition was to be a constable. Later at a funeral, he wished to be that important personage, the sexton; then a preacher; then a school teacher; but successively each of these roles discovered features that repelled him, and the best thing he could say to young people in trying to give them the essence of life was this: "The best thing in life is labor."] The decree passed upon Adam, "In the sweat of thy brow thou shalt eat bread," was not a curse, but a blessing.

Education is to prepare for life, and as labor is the chief thing in life, education is to prepare for labor. I saw a statement that a pupil who has finished the graded schools is twice as valuable in the industrial world as one who has not; and the one who completes the college is seven times as valuable. There are those who have done well without schooling; but in considering what their natural ability has accomplished it must be remembered that they are themselves the product, and their work is in the midst, of a civilization which is predicated upon the public schools.

Education includes direction for the mind and an acquaintance with objects. It is a pedagogical truth that every child is entitled to an education embracing those branches concerned with his environment. This is the education of the common school. After he has completed such education as that covered by the district schools, he is entitled to an education with reference to the world outside—history, literature, science, institutions of government, and art—and to become acquainted with the world, not only beyond the limits of his own state, but beyond his own time, that is, with the

past. Cicero says, "One not familiar with history must always remain more or less a babe."

As a third step every youth is entitled to come back, with this knowledge of the distant world, and study the institutions of his own country. In some degree our education has been ignoring this last step. We are called upon to solve problems, not only connected with sociology and art, but individual and life problems. The unrest of the present time is caused by the spirit of inquiry aroused by the second step in the education of the masses. North and South should have understood each other, and there would have been no civil war. We are unwise in trying to solve our problems without going outside of our own region and visiting other peoples and their times.

There is a disposition on the part of some to think that children ought to decide very early what they are going to do. When a child is born, the mother hears many remarks about what the child is going to be. Trifling signs from his features or movements are taken as indexes to his mental bent. There is no need for anxiety as to what the child will become. Let him take up his manhood work when he is a man. When he is a child see that he has proper surroundings for the life of a child. Let him have a simple development of the natural faculties and activities of life. If he passes rightly thru this, he can then choose intelligently what profession or occupation he will enter when the time comes. In the first six or possibly ten years of a child's life, those subjects which are now embraced in the best planned courses of study for our common schools are the things in which the child should be most interested. Let him be thoroly grounded in those; his activities quickened, awakened and perfected.

After receiving the elements of an education, the child should be sent to the higher institution of learning and become acquainted with literature which has become sacred and which has become, by virtue of its perpetuity, an inheritance of the race, and there gain some knowledge of the world in general.

Then the question comes, what is he fitted for after graduating at the institution of learning. Some will say, so and so has studied languages, has become familiar with literature and science, and has graduated; now he is working in his father's soap factory. What is his education good for? And others are pointed out in the same way. Now how short-sighted these people are who criticise the products of the colleges and universities in such a way. Follow some of these graduates in that store, on that farm, in that soap factory, or foundry. See what is to be the result of education. The young man, strong and wise, with dignity and manhood, goes on with the work his father was engaged in. See how the father's work is dignified, lifted up, by the intelligence, consecration and labor of the product of the college. The work is more effective. What was formerly wasted as slag, becomes a new mine of valuable ore. Many examples may be given of the benefit to industry from intelligence and knowledge.

The graduate should not think that by his education he has passed into a merely intellectual world, out of reach of his old associations.

He should come back to the environments of the home, the mine or the mill, and adjust himself to it in such a way that it begins to hum again, and the spindle to make sweeter music than in his boyhood. Education should not be regarded merely as a means to position among men; as the way to some profession, calling or particular place where everybody will show deference. This notion should be dismissed. There are more desirable positions in the common walks of life than can possibly exist in the few higher ones.

All along in this educational movement, the work done must be thoro. Mere knowledge is of comparatively little value. That which is of value is to have power to think rapidly, accurately and comprehensively. Education which fits for life means thinking rapidly as well as accurately. Opportunities are coming to us and are passing away, and we have failed to catch them. There have been many beautiful descriptions of opportunity, but the one which impressed me most was that of three darkies who went to see the express train go by on the new railroad. They went early to where the train was to pass and waited. Finally the train was heard. One darkey exclaimed, "Dah she comes;" and another, "Dah she goes;" but the third gaped around and asked, "Whah is she?" Thousands of people are looking about and wondering, "Whah is she?" The young man who has learned to think correctly and rapidly at the same time has learned to know "whah she is."

Education that fits for life must help us to adapt ourselves to environment. Only as we see relations can these relations be brought about.

What has this to do with the Domestic Science Building? I congratulate you on entering this new building, and hope the state will do as well by us. We have to eat, and like to wear nice clothes, as well as you; but will have to rely for many years on the kind of food and kind of clothes you folks set up for us here at the Agricultural College.

The problems of domestic science are as important to the great question of human happiness as are many of those other problems which we have been so long exalting and to which many of us are giving our lives.

CHANCELLOR MACLEAN.

I come to bear you greeting from a university which is your nearest neighbor, next to the university in your own state. I come to bear greetings to a board of regents from a board of regents elected directly by the people, a board of six regents in which at the present time all parties are represented, and every man is all for the good of the university. I come to bear greetings to your faculty from a faculty of 187 professors. I come to bear greetings to you students from two thousand students, strong and stalwart Nebraskans, and some of them more stalwart Kansans. I come to bear you greetings from a university with eight great colleges and schools; and with special pride I bear you a greeting from one of these colleges, the College of Agriculture and Mechanic Arts. This we cherish as a jewel in our bosom; a reminder of the patriotism of Abraham Lincoln, of the contributions of the United States in

establishing these colleges in every state in the union; and that Industrial College, some four-hundred strong, has grouped about it several schools of agriculture and mechanic arts among which, last and not least, a very little sister, is the School of Domestic Science and Art. I bear you greetings from all these institutions in your sister state; and, if I had mentioned it to the legislature yesterday, no doubt they would have sent the greetings of the great state of Nebraska to this twin state of Kansas. There was once a Kansas-Nebraska bill, and let us remember that these states have been worthy sisters of a twin birth. Nebraska has generally followed in your footsteps, has even followed you in the matter of party politics. Whenever this state changes our state changes just two years later. Only once it was the other way; Nebraska failed to adopt prohibition two years after Kansas.

I feel perfectly at home in meeting you, fellow students. If there is any place outside the church of God where there should be comity, it is between the institutions of higher learning. There is a republic of letters more inclusive, more full of sweet hospitality and charity, than even the church of Christ. It has a universal communion. Westminster Abbey is a house of reconciliation. American rebels lie beside British tories, Roman Catholics by Protestants; liberals, radicals, and tories, lie together in peace; and what Westminster Abbey is to the Anglo-Saxon race the great republic of letters is to all human thought and human parties. There must be liberty to differ in opinion and discuss and criticise and yet maintain fraternity, dispassionateness and the pure science of investigation. Blessed be academic freedom, to be maintained as long as higher learning lives, as long as we have colleges worthy of the traditions of the republic of letters.

It was to give a token of this comity of the colleges that persuaded me I had almost a sacred as well as a glad mission in bringing greetings to you to-day. The comity of colleges does not always appear in this high light. It has appeared as tho the interests and endeavors of different institutions were opposed to one another; but comity has become real in the state of Nebraska, and I have no doubt is real in the progressive stage of civilization into which you have entered in Kansas.

The comity of colleges should be much more manifested than it is. Faculties should "exchange pulpits" much more than they do. Professors from this institution should occasionally appear as lecturers in neighboring institutions and vice versa. There should be an occasional calling of professors from one of these institutions to another, and an exchange in that fashion. There must be no in-breeding to excess in any college. It is just as woful as continuous in-breeding in a single family; and an old college like Harvard, while she honors her own sons, calls the men best fitted from whatever college they may have graduated, and it is now to Harvard's credit, not particularly to that of Nebraska, that a graduate of our university, for example, is a professor in old Harvard.

There must be migration upon the part of the students. We are in these later days, we Americans, not so much Anglo-Saxon, tho we boast we are, as French in certain aspects of our life. We grow ex-

tremely enthusiastic, which is good, but we tend too become too intense and therefore narrow and excitable; so when a young man or woman has been once in a given college he becomes so thoroly loyal to that college that he is inclined to belittle other colleges. It is not so in Germany, the home of learning. There a student expects to visit two or three universities in the course of his progress toward a degree. Each student has a blue book and carries his credits from one university to another as he migrates. So the German student seeks the best professors for his needs in each subject as he takes it up; and so when he graduates it is practically from a general German university. If the college student in our land will not migrate while making one degree, as the American student is not inclined to do, then he should take his second degree in another institution, and his third in still another. It is not disgraceful, but rather a credit, to have several names of colleges from which a scholar has graduated in succession.

There must be further student intercourse in athletics. Our university contests each year with the University of Kansas. Why is not Manhattan known beyond the borders of this state, as doubtless it is within them? We should compete in football, baseball, and track athletics. The young men should have the same privilege in this that we old ones have in intercollegiate associations, associations of agricultural colleges, philosophical societies and academies of science. The athletic games are for the student what those are for the professor. All these are parts of the comity to which I have referred.

The agricultural college is an important part of the university. "Theology," said Bacon, but agriculture, it seems to me, "is the haven of all science." Education means not the development of dudes, but the training of servants for the state, the republic, the church. We have the responsibility of leading our nation into the civilization of the twentieth century; and so we want a university standing on many feet, resting on every part of society.

AT THE BANQUET.

Hon. J. N. Limbocker, regent of the College, gave a brief historical sketch, telling why there is the opportunity and necessity of dedicating this building to domestic science and art. Twenty years ago men were not thinking of industrial or domestic arts. Thru thousands of years of learning, only thus recently have we come to the pursuit of these. For more than a generation the American people had been actively founding colleges, but only in 1862 did they first make provision on a large scale for founding colleges of agriculture and the mechanic arts. This College, founded on that provision, grew until the last legislature of Kansas, coming largely from rural homes, and appreciating the necessity of domestic skill, appropriated money for this building. It was only \$16,000, but it has paid for the complete building. To Professor Walters, who has assisted in or seen the construction of every building on the campus, the board

turned for help and consolation. He was the architect, and superintended the building.

"THE HOUSE THAT JACK BUILT."—PROF. J. D. WALTERS.

The professor began by stating that his work, the building, might speak for itself. (The cheers of the company attested their opinion that it spoke well). The history of the building began when this department was organized, a quarter of a century ago. One sewing machine, and later another, were planted in the corner of the chapel in the old armory. The total cost of the equipment was about \$75. Later a cook stove was bought, and Mrs. Cripps, a very energetic lady, and a good teacher, was installed as teacher of cooking. All this was in the administration of John A. Anderson. President Anderson was one of the earliest men in the country to attempt to realize manual education. He had crude ideas, and did not recognize some of the axioms of the present day, but he sought for the truth, and was on the right track. In 1886 the department moved from the chemistry building to the basement of the main building. When Mrs. Kedzie became professor she added another cook stove. In those days the appropriations asked for were very small, five or ten dollars at one meeting of the regents. It was a deep disappointment to Mrs. Kedzie and the girls in 1895, when the legislature left them for two years more in "the cellar." But at last the need was recognized, and here is the completed building.

"THE FARMER'S DINNER."—HON. ED. SECREST.

My wife and I sent five girls here, and I could see the improvement when they came back. We are better appearing and better citizens for their coming here and learning. Think of the banquets of former centuries, how they passed around the quarter of beef and every guest swiped off a hunk of meat! What has wrought the difference in the farmer's dinner? The schoolmaster is abroad in the land, and the schoolma'am has had her part. She has looked into the farmer's kitchen, told the daughters what was needed, and scolded the old man for not having things better. She has learned new ways and taught them, and so the farmer's dinner, and that of all who till and toil, has become better. If I were less of a heretic and more orthodox I would add another petition to the litany: "From the musty mandates of mummies, from worm-eaten conservatism, from the old, well-worn, deep ruts, from the dicta of dead cooks, good Lord, deliver us."

"CIVILIZED MAN CANNOT LIVE WITHOUT COOKS."—HON. C. B. HOFFMAN.

Mr. Hoffman, like Mr. Secrest, has spent some years serving the college as a regent, and both have sent a succession of their children

as students. Mr. Hoffman gave a humorous speech which can hardly be reproduced here. He said that men might be cooked, many have been made mincemeat of, some roasted, while others are sometimes in a pickle or a stew. This was his condition when he learned that he had to make this speech. There have been books of cooks and cooks of books. The former are found on the shelves of libraries and booksellers; the latter should be found in the penitentiary, for cooked tax rolls or ledgers are most disagreeable articles. The speaker quoted the lines from Owen Meredith:

We can live without poetry, music, or art;
We can live without conscience, and live without heart;
We may live without friends; we may live without books;
But civilized man cannot live without cooks.

He may live without books; what is knowledge but grieving?
He may live without hope; what is hope but deceiving?
He may live without love; what is passion but pining?
But where is the man that can live without dining?

"TO REAR A WALL OF MEN."—HON. EDWIN TAYLOR.

In talking about building a wall of men, I am hampered only by the outer edge of my imagination. So I will say that if you start in with the right sort of men they will build the wall themselves. If you have men full of devotion you can let them down into the human solution called society, and men will crystallize around these, even be it in martyrdom or where the cannon fire. You have first to "catch your man;" but fortunately we belong to a race which has ever been responsive to great ideas, a race in which self-sacrifice is a more dominant power than self-gratification. Of the Kansas pilgrims it was said: "They go to rear a wall of men on freedom's southern line." What for? Not to get rich; but to extend "the homestead of the free," to bring the blessings of Naseby and Marston Moor, Bunker Hill and Saratoga, even to the bondman. And they did. The foundation was laid at Osawatomie, the cornerstone at Gettysburg, and the capstone Appomattox; and now in the year just passed another "wall of men" has been raised on freedom's southern line, and even in this last week our men have pulled down the flag which for four hundred years has cursed the Antilles, and raised in its stead the glorious stars and stripes.

We should recognize as a factor in education the unsalaried assistance of the boys in school. The other boys give some of the best lessons without solicitation. The schoolmaster has on occasions been a positive bar to progress. The word schoolman has become a synonym for stiffness in an intellectual mold.

Oxford and Cambridge were strongholds of royalty. The tory party in our revolution was made up of the classes of leisure and education. And at the present time the idea that a man is entitled to grow because he is a man has been more strenuously resisted in

the university than any other place; but economic emancipation will beat back the cloth and the gown as well as the counting room.

The chief trainer of a boy is his mother. A wall of men which will stand against all shocks—for such a wall give me the sons of mothers who have been taught the story of humanity's upward struggle in an atmosphere which was sympathetic with that struggle and intolerant of its wrong.

THE NEW REGENT—HON. CARL VROOMAN.

I have been much interested in this College for the good work in which it is a pioneer. In Germany we find bootblacks who can speak four languages and Ph. D.'s by the score waiting upon tables in cheap restaurants. This is because in former times education was a matter of Latin and Greek, of writing poetry in dead languages; and much of it now is mere scholasticism. Harvard was the first of the old conservative colleges to decide that Latin was not necessary. She must go farther and say that not literature nor science nor anything requiring mere memory is necessary for education. This younger College can teach the old universities.

Here the individual is taught to make the most of his life, and how to succeed in the stress of modern competition. China is a monument of the deathlike influence of learning divorced from life; of that conservatism which is so in love with the good that it cannot see the better, that will not change the bad for fear of making it worse. I, too, love to grope amid antiquity and bear my tribute of admiration before the noble minds of old; I, too, love to revel in the old heroic days and bathe my spirit in the glamor of the times that are past, but only that therefrom I may gain a deeper inspiration with which to face the mightier problems of to-day.

"THE HIGHER EDUCATION OF WOMEN." MRS. ANNIE L. DIGGS.

One of the very first achievements which I trust the higher education of women will make is the discovery of that vicious little microbe which causes the grip. It has eluded masculine pursuit, and if women in their higher education shall succeed in wiping it off the map of human experience they will have won their place in the gratitude of the world. I am a sufferer from it at this time.

I am told that there is standing to-day in Pennsylvania the ruins of a school house where once boys only attended; as time rolled on mothers desired to have their daughters taught the rule of three, so some of them started their little girls one morning to attend school. In a hasty meeting of the school board, one declared that if the time should ever come when boys and girls should attend the same school together, the very foundations of morality would be shaken and home life would be at an end. I believe there are to-day in the state of New Jersey, certainly not in Kansas, and I hope not in Nebraska, men thinking of the higher education of young women, thinking of them as graduates of colleges, who have just the same nightmare of fear. If woman tries to explore the fields of the sciences and the higher literature, some how or other the foundations of morality and home life will be interfered with.

It is not merely ludicrous, friends, this concern which people have lest something uncanny may happen to the home; I think it is the instinctive knowledge on the part of men and women that in some way or other the home is the great foundation of all that is worth living for. Some one has said that it is a long way from the gorilla to the gentleman. Surely it is a long way from the woman who believes she ought to sacrifice herself upon the funeral pyre of her husband to the splendid specimen of the American woman who is to preside over this department in the Agricultural College. During the long time of that development, while women were gradually taking a little more and a little more of this world's good things, the home instead of deteriorating, the foundations of morality instead of being shaken, were both of them improved and developed; and I believe we may predict of the higher education of women that which has taken place in the past as the result of woman's progress and advancement.

I am one of those old fashioned women who believe that the home is woman's especial sphere. I stand here to declare that I believe it is almost always a calamity when a woman must go into the struggle for existence and enter the ranks of woman bread winners in the present conditions. I believe that home is the place where character is developed, and the human race has lived long enough since the time of the gorilla up to the time of the gentleman to know that life is dual in its nature, that the work of the world is differentiated, and that man's work is on certain lines and woman's work is on certain other lines. It has been part of the work and the life of man to go ahead in the struggle of life to do the pioneering of the world, to clear away the obstacles. They can face the pioneer conditions, and they feel the frosts and they conquer the obstacles. When they go away to their pioneering on the Pacific coast or elsewhere, in the frontier towns, they tell dreadful stories about themselves as to how demoralized they become alone by themselves. I believe that God made no mistake when he put man and woman in the same world together to work out the problem of life.

Later, after men have done this pioneering work, then comes the time for woman's best expression of her work; and it is my absolute belief that the higher civilization requires the development of woman in every faculty of her life and character. Looking abroad upon the tragedies of life, the travesties of home, the shelters where people exist but do not live, my soul is saddened:

Yet sometimes glimpses on my sight,
Thru present wrong, the eternal right;
And step by step, since time began,
I see the steady gain of man;
That all of good the past hath had
Remains to make our own time glad,
Our common daily life divine,
And every land a Palestine.

And looking into the future I see the woman who shall have studied Greek, art, mathematics, and all the lore of colleges, who is a self-centered, self-poised individual. I see the union of that woman with the self-centered, self-poised man; and there I behold the ideal home,

with neither an inferior or superior, but each dwelling with the other as a helper, comrade, complement, aiding the other. I see that woman of higher education teaching her children that the merciful man is merciful to his weaker and smaller brethren. I see the woman giving her boy to read not *Ivanhoe*, with its tales of cruelty, but Wordsworth's poem teaching the inhumanity of the hunt; likewise he will learn to see the barbarism of the battle. Not in the line of bayonet and bullet shall civilization progress, but in the line of the glorious example of better lives of men. The horrors of war are to be thought of with all of the pity and all of the abhorrence that you can conceive of the worst nightmare. That evil day is passing away. I say this in spite of the fact that our own nation, unhappily and shamefully, is preparing for a larger armament, is equipping boys and men to go to foreign countries and kill their brother men. But, friends, there are no foreign countries. The fatherhood of God and the brotherhood of man preclude the idea of there being foreign nations whom it is legitimate to shoot and kill. Women know the value and cost of human life. They know in what travail of soul and body human life comes into existence.

I believe that the higher civilization cannot come until in the home the future woman, on the same intellectual plane with the comrade of her life, shall teach and recommend but one standard of morality for man and for woman.

The future home is not altogether of the future, for here and there dotted over our fair land there are already ideal homes; there are the ideal woman and the grand man. In the long ago past, in the days of Greece and the Roman dominion, the educated women were exceptional; but it is the most glorious feature of our civilization that now the uneducated and undeveloped woman is the exceptional one. This is the hope of the future; this is the salvation of our race. This educated man and woman shall consult together, and when the time comes, as foretold by our own Whittier, they will together register their choice at the ballot box; and together they will

Strike the key
Of time to be,
When God and man shall speak as one.



MINUTES OF BOARD MEETING, Jan. 2 to 7, 1899.

VOTED that application be made to legislature to change the name of the College to Kansas State Agricultural and Mechanical College. The students' suggestion that students send representative committees to legislature with a view to securing legislation in the interests of the college was cordially approved.

Voted that, Agricultural department be allowed to expend out of its annual appropriation \$300 for dairy apparatus.

Assistant Burtis was granted leave of absence without salary until the close of his contract year.

Voted that, until a professor of horticulture and entomology be elected, Mr. W. L. Hall be put in charge of the Horticultural department and Mr. P. J. Parrott in charge of the Entomological department. Mr. C. P. Hartley was made assistant in the Horticultural department for the winter term. Two hundred and twenty-five dollars were appropriated to provide an assistant in the Veterinary department for the winter term, said sum to be drawn from funds that would normally go to chairs now vacant.

The office of major of the college cadets was created; it was later filled by appointment of R. B. Mitchell on recommendation of battalion. Mr. Mitchell also made acting commandant. The president of the College was authorized to make requisition for twenty cadet rifles and accompanying ordnance.

Prof. E. E. Faville filed his resignation as professor of horticulture and entomology, which was accepted, and the following resolutions spread upon the records:

Resolved, That it is with much regret that the Board of Regents learn of the desire of Prof. E. E. Faville to sever his connection with this institution.

Resolved, That we recognize in Professor Faville a competent horticulturist and entomologist, of scientific spirit and practical instincts, energetic, enthusiastic, tactful, strong in class room and in farmers' institute work, and a valuable member of the college faculty.

Resolved, That we congratulate the institution at Doylestown, Pennsylvania, upon securing the services of Professor Faville, and that we anticipate for him and the institution committed to his charge a large success.

A four years' course in civil engineering, outlined and recommended by the president and faculty, was adopted. The president of the College was directed to prepare a business course of study for submission to the Board of Regents.

It was voted to reduce all interest rates on land contracts after Jan. 1, 1899, to seven per cent. The president of the College was instructed to inform all parties owing on land contracts that they may continue their contracts indefinitely, provided they pay their interest promptly as it matures.

Miss Olive Long was made a regular employee in the executive office until such time as a secretary shall be appointed. Miss C. Jeanette Perry was made an assistant in the Printing department.

On Friday evening Regent Munger retired from the Board of Regents, and on Saturday morning Regent Carl Vrooman took his seat and filed his oath of office.

The chairman of the Live Stock State Sanitary Commission having telegraphed for the services of Dr. Fischer, it was voted that a telegram be sent in return stating that "Our professor of veterinary science is overwhelmed with work and cannot respond to the call."

A student committee appeared before the board and presented a numerously signed petition requesting that a room in the armory be set aside for a gymnasium and suitable equipment provided. Voted that the legislature be asked for \$500 for gymnasium and baths.

A committee was appointed to fill the positions of professor of horticulture and entomology and dean and secretary of the faculty.

Board adjourned to meet at the call of its president.



LOCAL NOTES.

Nearly seven hundred students present in classes.

Miss Winston and Miss Howell spent their holiday vacation in Chicago.

The next meeting of the Riley County Teachers' Association will be held February 4, at Riley.

Hiram Holzer, of the Senior class, has been promoted to the position of salesman at the College Bookstore.

Professors Ward and Parsons were unable to meet their classes during the first week of the term on account of illness.

At the recent meeting of the State Horticultural Society Mr. Percival J. Parrott of this College was made entomologist of the society.

During the first two weeks of the winter term the Bookstore department of the College sold books and stationery to the amount of \$983.59.

The December faculty party was held in President Will's home, and that of January in the home of Professor Bemis. Both were delightful gatherings and well attended.

Lieut. W. A. Callahan has been promoted from second to first lieutenant, and transferred from troop L to troop G. Lieutenant Callahan was a student here some four or five years ago.

Miss Florence R. Corbett, '95, left for Brooklyn, N. Y., Tuesday, to take a special course in domestic economy in Pratt institute. Miss Corbett will devote a portion of her time to instructing in the same institute.

During the first two weeks of the term Professor Walters kept the telegraph wires between Manhattan and Chicago hot with additional book orders. Every class in College was larger than had been anticipated.

Lew Hardy, of Manhattan, lately of the Fort Riley hospital corps, recently received an appointment as acting hospital steward. He was ordered to the Philippines, and sailed from New York, Jan. 15, via the Suez canal.

George L. Clothier expects to go to Cornell University in a few days, on leave of absence until the first of June, for the purpose of studying plant breeding with Professor Bailey. He expects to come back in time to assist in crossing the wheat which has been planted with that end in view.

Mr. W. H. McKinstry, of Scottsville, Kan., writes that since Mr. Burtis lectured at the institute in that place there has been greatly renewed interest in scientific dairying. His patrons have been coming to him for information and he finds it desirable to secure bulletins and other assistance from the College.

Mr. G. B. Ruth, of Halstead, Kan., writes: "In contrasting our bulletins with those from Cornell and the U. S. Department of Agriculture I am so favorably impressed by the excellence of your station that I am proud to say that we farmers of Kansas need hardly go outside of our state for information on matters concerning the agriculturist."

C. C. Jackson of the senior class has been elected instructor in physics at the National School of Agriculture, at Doylestown, Pa. As he was ahead of his class in some studies and intends to make up the remainder of the course, he will probably graduate in June with the class of '99. Mr. Jackson was salesman of the Bookstore last fall term, and is a hard working and trustworthy young man who will undoubtedly make his mark in the world.

The number of farmers' institutes held or attended in the past by delegations from the College was from six to twenty per year. This year the College will assist in nearly a hundred. Over fifty were held before January 1. Some years ago Hon. Martin Mohler, of Osborne City, at that time the secretary of agriculture of Kansas, asked the legislature for \$20,000 to hold a farmers' institute in each county. The Agricultural College is doing the same work and receives nothing.

The Independence *Star* says: "There is no possible doubt but if the farmers of Kansas thoroly understood the advantages given to the young people of the state at the State Agricultural College at Manhattan, that institution would be crowded to its utmost capacity very year." This is well meant but the fact is that the institution has been crowded to its utmost capacity for some time. What we are praying for, just now, is more class rooms and more professors. Every chair, every seat, and every window bench is crowded with young Kansas farmers and mechanics.

Editor A. Sorensen of the *Skandinavisk Farmer*, published in Minneapolis, Minn., writes to Professor Cottrell: "Some days ago we received from your Experiment Station a copy of your Bulletin No. 81. 'Feed and Care of the Dairy Cow, which we find of such

value that we would like to translate it for our paper. Will you kindly permit us to publish this translation in the Danish language? There are several of your bulletins that we should like to use in this way to the benefit of our readers, and shall very much appreciate your permission to do this as well as to receive your bulletins regularly."

A count of the stubs in the secretary's office shows that 659 regular students and about fifty apprentices and postgraduates have been assigned to work during the first two weeks of the winter term. This is an increase of twenty regular students over the total enrolment of last fall term. At this writing, January 14, there are still new assignments being made, so that we feel justified in predicting once more the greatest attendance in the history of the College for each term as well as for the year. Last year the total attendance was about 810—the catalog, printed in April gives it at 803—but this year it will probably exceed 850.

From the *Scandia Journal*.—"The botanical department at the State Agricultural College has been counting weed seeds to see how many a good thrifty Kansas weed will produce. Following are some of the results: purslane, 69,000; red-root, 85,000; pigweed, 155,000; yellow foxtail, 113,600; water hemp, 945,000; sand hill tumble weed, 367,600. When Kansas farmer boys read these figures it will imbue them with an irresistible desire to go out and kill weeds before they get a chance to go to seed. These same boys will be extremely pleased to know that in four years a plot of ground ten feet square produced 70,825 weeds and it was not good ground for weeds either."

Professor Emch has discovered a principle in synthetic geometry which permits the construction of an apparatus by means of which the perspective of any form of two dimensions may be drawn in the same manner as the pantagraph produces proportional figures. The professor is having an apparatus of this kind constructed. It is remarkably simple, and represents a principle entirely new to mathematical science. Some years ago, while at the State University, the professor commenced to write a series of articles on the transformations of geometrical figures, and this fall while at work at the closing chapters of this work, which has been highly commented upon by mathematicians of America and Europe, he discovered the aforementioned facts.—*Students' Herald*.

The College was well represented at the several annual meetings of state societies at Topeka during the last week of December. Professor Walters read a paper on "Drawing" before the teachers' association and gave an evening lecture before the State Horticultural Society. President Will addressed the horticultural society on the work of the College. Professor Faville spoke to the horticultural society on "Modern Methods of Handling Fruits;" he also made reports for several standing committees. Professor Harper took a leading part in the discussion of "Manual Training in Public Schools" at the educational association. Professor Willard read a paper at the Academy of Science on "Variations in the Nitrogen Content of Corn;" he also spoke at Oak Grange farmers' institute in the

same week. Mr. Hall addressed the horticultural association on the "Utilization of Native Fruits." Professor Hitchcock, in the same week, spoke at Indian Creek, near Topeka, his subject being "Notes on Weeds."

Perhaps the most striking evidence of the growing consciousness of the necessity of education for practical life and for the purpose of civilization is the enthusiastic response to Lord Kitchener's appeal for a fund to found a college at Khartoum [as a memorial to General Gordon]. The significance of this institution will not be its connection with the memory of a devoted man; it will rather be its relation to the needs of a new country and its illustration of the spirit of an old one. When successful generals propose to found colleges as the first step toward consolidating the results of military successes, the age has evidently moved a long way onward. The kind of militarism which General Kitchener represents in this suggestion is not one of which civilization need be afraid. The army which believes in the college and is the forerunner of the college is an army of construction and not of destruction.—*Outlook*, Dec. 31, '98.

This College needs more room—it must have more room or stop growing. Every class room is full to overflowing. In many rooms the students have to sit on the edge of the professor's platform or climb upon window benches and experiment tables in order to attend the lectures and recitations. Every seat on both floors of the chapel is occupied, the orchestra has been crowded around the piano, the postgraduates have been told that they have had seats for four years and can no longer be accommodated with such luxuries, the apprentices have been counted out of chapel altogether, the visitors have to rob somebody of a pew before they can attend exercises, and there are about a dozen regular students who have to stand around the radiators at the rear because of a lack of room and seats. The shops, the laboratories, the drafting rooms, the lecture rooms—every part of every building is crowded to the utmost. Will the legislature help us?

A formerly-of-Kansas man, Mr. C. E. Faulkner, now of Minneapolis, Minn., who still maintains his interest in Kansas affairs, writes Secretary Coburn as follows: "There is a sharp struggle for prestige in the manufacture of butter, and Minnesota is alive to her interests. Kansas should, by all means, equip a dairy station at the Agricultural College, and push for a place which will be creditable to her possibilities. Butter flavor is a secret of nature which the chemists have not yet discovered; but there is no doubt that Kansas furnishes in her pastures the very best conditions for butter of prime flavor. The character of stock, processes of feeding, and the delicate operations of the creamery, are matters for careful study, and a good experiment station will work out the solutions at less cost than can be done where each operator follows his individual notions. There are some idle creamery stations in Minnesota, just as there will be in every state where skill and care are lacking, but all parties give credit to the system of schools fostered by the efforts of the Dairy Commission and the work of the state station.

Let the Manhattan school have money to equip a first-class plant, stock it with the best cows money can buy, and give to the farmers the dairy information, and the state will move to the front, where she belongs."

REGENT CARL VROOMAN.

The appointment and confirmation of Mr. Carl Vrooman, of Parsons, as regent of the Agricultural College, gives general satisfaction all over the state. When the news of his appointment reached his home and the press began to discuss his qualifications for the position, the citizens of Parsons held a rousing meeting at which the following resolutions were passed:

WHEREAS, It is well known that Carl Vrooman is one of a family of scholars, journalists and clergymen of whom our honored state may well feel proud;

Resolved, That we recognize in Carl Vrooman a young man of culture and refinement, educated in the best colleges of the United States and Europe, who has spent the best years of his youth in fitting himself for the accomplishment of his sole ambition, which is the betterment of humanity; that he is a gentleman whose character is above reproach and whom our city is proud to own as a citizen; and,

Resolved, That we do commend the action of Governor Leedy in appointing him, and the wisdom of our senate in confirming him as a regent of the State Agricultural College, and we know him to be peculiarly fitted to fill such a position with the dignity which the office demands.

GREENHOUSE NOTES.

Beds have now been placed under all the high benches in the propagating houses. Here we can store a large number of bedding plants till the hot beds and cold frames can be used. We hope to produce enough plants to supply a number of beds on the lawn next spring.

An excellent collection of chrysanthemum sprouts has been received from Mr. Richard Miller, a florist in Abilene, Kansas.

The chrysanthemums that bloomed last year have been turned out of the pots, and the sprouts potted in small pots. We hope to be able to give a larger and more complete chrysanthemum show next year.

A large number of cuttings have been made from Coleus, Geraniums, and Alternanthera, also a number have been made from the forcing roses and carnations.

The calla lilies are showing some very fine blooms. The bulbs that were potted and put away in the cool cellar have now filled the pots with roots, and we are bringing them to the light and heat as the blooms are wanted.

VETERINARY DEPARTMENT.

The Veterinary department's Christmas vacation was spent in continuing the investigations of hog and chicken diseases begun the week before. A number of experimental animals were inoculated. The department has received a new $\frac{1}{2}$ apochromatic oil immersion objective, from Bausch & Lomb, and a number of compensating eye-pieces. The department is approaching nearer and nearer the time when the microscopic equipment will be first-class in every respect. Dissecting outfits and dissecting material for the junior

class in biology have also been received, and material for microscopical work in biology has been collected in large quantity. Two additional microscopes have been ordered for class work in biology.

Engagement to inoculate, for Beloit Creamery Company, 200 hogs with protective virus against swine plague has been temporarily postponed on account of a new outbreak of the disease. The experimental pigs are doing well, and do not show the least indications unfavorable to the inoculation experiments. Applications for blackleg vaccine are coming in with increasing numbers.

Mr. J. W. Kibley, one of the leading cattle men of Butler county, was at the Agricultural College, January 5, to make arrangements for obtaining sufficient vaccine to protect 300 calves against blackleg. This vaccine is furnished free by the Veterinary department to farmers and stockmen of Kansas who request it.

The Veterinary department has several fine, prepared specimens of *Taenia fimbriata*, obtained at the time of the investigation of this disease in Logan county, when nearly 300 out of 505 sheep died of this form of tapeworm disease.

PROFESSOR FAVILLE PROMOTED.

Prof. E. E. Faville, professor of horticulture and entomology at this College, has left us for work in a broader field. While there is a considerable degree of latitude in the position the professor has held here, he has found it in a greater degree as president of a comparatively new institution. At Doylestown, near Philadelphia, is located what is called the National Farm School (because it is national in its scope) which was founded by Krauskopf in 1893 and began actual work in 1896. It is under the direction of the Reformed Jews of the United States and is heavily endowed. It is strictly agricultural and aims to teach the science of farming in all its modern developments. In selecting Professor Faville the management has chosen a man with a wide experience in his line of work. Having taken courses in the Agricultural colleges of Iowa and Michigan, and having been sent by the Fruit Growers' Association and the government of Nova Scotia to Europe for scientific investigation and study, he has had an opportunity of becoming familiar with the work in all kinds of soil and climate. In his work here in the development of the cold storage idea, fertilization, and the destruction of insect pests, he has given the department an impetus which will be lasting. The professor has been given the privilege of choosing the greater part of his faculty, which he will be fully capable of doing because of his extended acquaintance with colleges and men. While his many friends will congratulate him upon the promotion to a higher field and an almost doubled salary they will greatly miss his genial fellowship and helpful counsel. It will be no easy task to fill the vacated chair with a man as effective, liberal and pleasant as he has been.

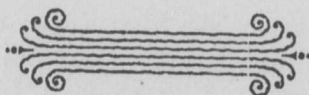
THE FARMERS' COLLEGE AND THE STOCKMEN.

At the stockmen's banquet on the night of Wednesday, January 11, President Will responded to the toast, "The Farmers' College and the Stockmen." He quoted Secretary Coburn to the effect that

the average Kansas cow returns her owner in cash \$9.65, while the more intelligently fed cows of Kansas creamery patrons average about \$20 per head. The college scrub herd yielded \$32 per head, while the best one paid \$60, tho costing but \$34. An annual yield of \$45 to \$50 per head is not uncommon among cows of creamery patrons who understand the science of feeding. Such figures teach us that many Kansas farmers are living far beneath their privileges. A dairy school at which their sons may be taught to breed, feed and handle cattle will enable them to increase many fold their profits on milk production.

Corresponding gains may be reaped from scientific butter and cheese production. Minnesota's dairy school, costing \$40,000, has created for her butter a worldwide demand, and increased its price per pound by one to two cents. An increase of one cent per pound on the present output of Kansas butter would mean an increase of \$400,000 per year to the state or ten times the cost of the dairy building, equipment and herd asked for from the present legislature. Wisconsin's \$40,000 dairy school has increased the profits of her butter makers \$6,600,000 annually. New York's \$50,000 dairy school has enabled her to make a superior quality of cheese, hundreds of carloads of which are shipped annually to Kansas, the Kansas consumers paying the freight on the grains shipped to New York for feed, the cost of feeding it to New York cows, the excess of cost of roughness raised on poor New York land expensively fertilized, and and the freight on the cheese back to Kansas. With adequate instruction, Kansas could produce all her own cheese, and become an exporter instead of an importer of this commodity.

Furthermore, there is a steady and growing demand for knowledge of the principles of feeding. Some feeders have already learned how, by more rational feeding, to double the daily gain of a beef animal, but much remains to be learned, and the economies possible from such knowledge are vast. The Kansas Experiment Station should discover the correct principles of feeding. To do so, it should be provided with a herd of beef steers, and should feed them in carload lots, that the results may be trustworthy. If the legislature will insure the College against loss from such an experiment, the Agricultural department will gladly undertake the work of feeding the herd.



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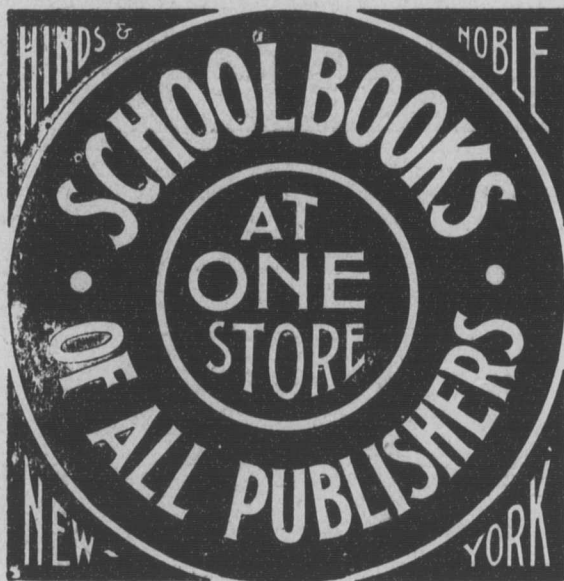
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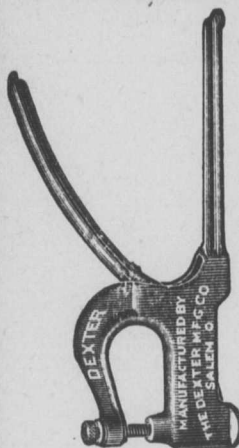
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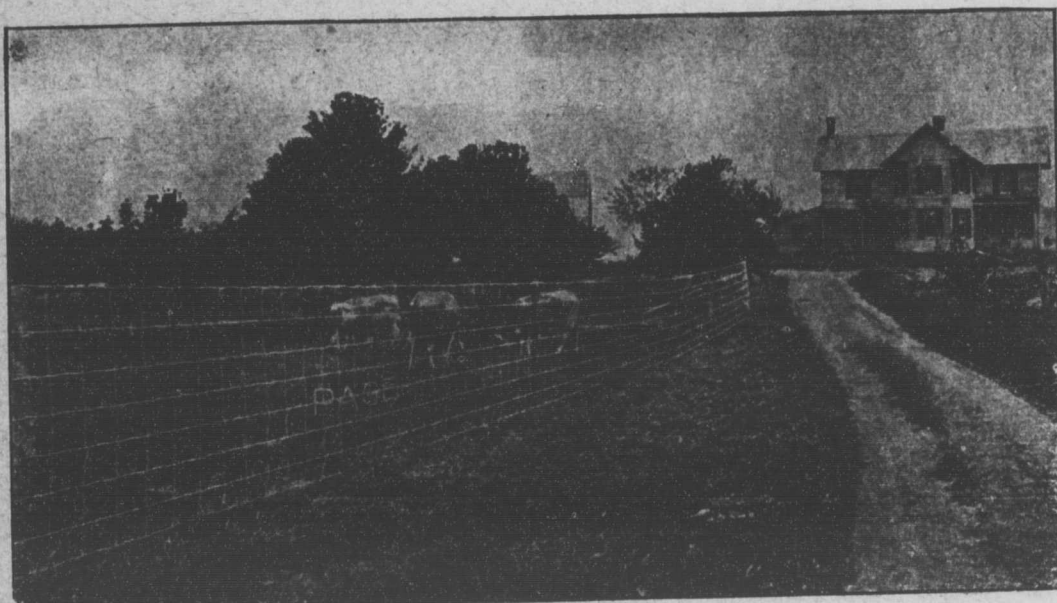
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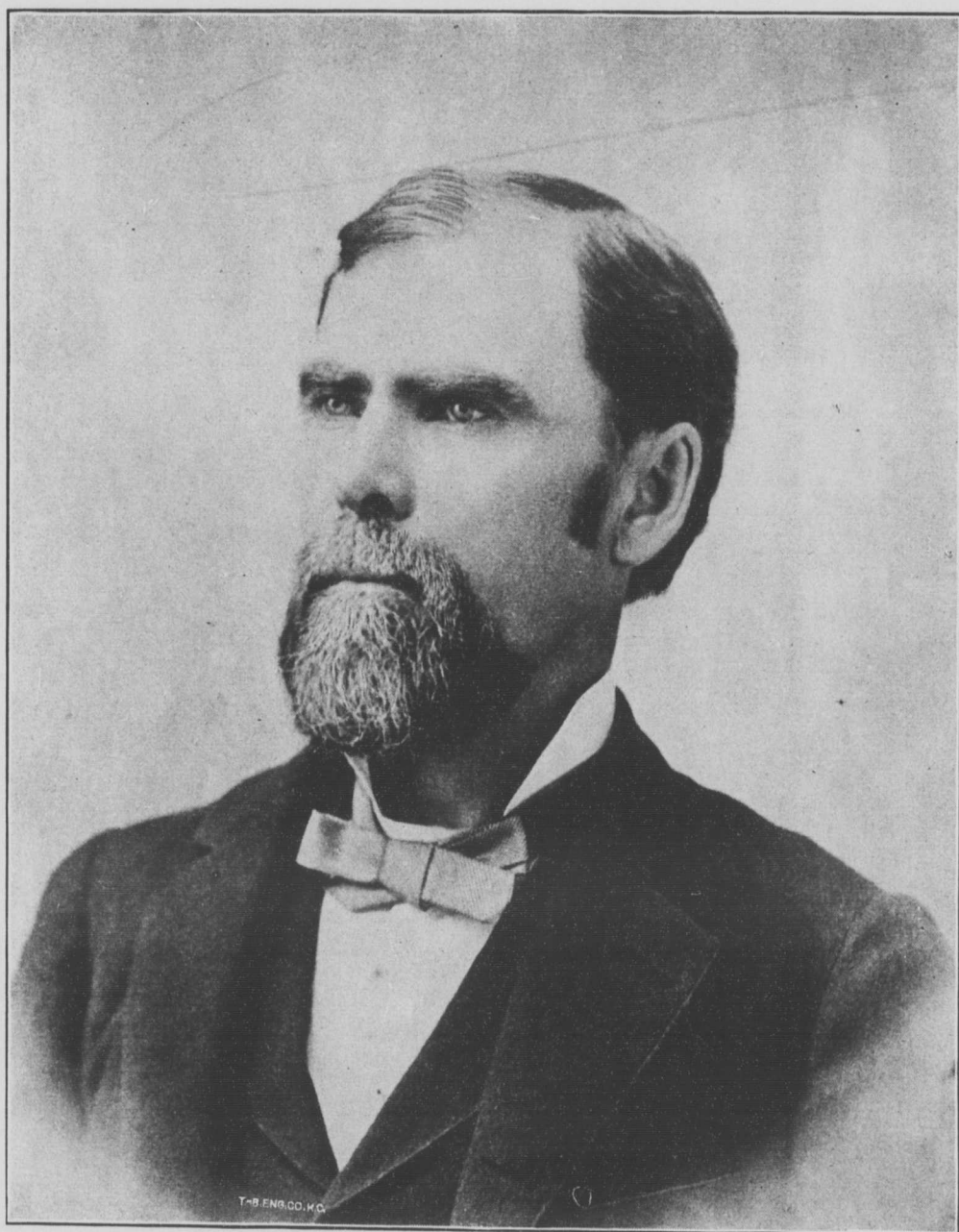
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HON. F. D. COBURN.

THE INDUSTRIALIST.

Manhattan, Kansas.

Vol. 25, No. 3.

March, 1899.

Whole No. 1020

JOHN WICLIF:

The Morning Star of the Modern Day, In Language, Politics and Religion.

BY DUREN J. H. WARD.

(Concluded from last month.)

A FEW days after the last arraignment, on March 27, 1378, Gregory XI died at Rome, and twelve days later the archbishop of Bari was elected to the tiara as Urban VI. His first acts caused the hope to rise in the minds of many that he would himself undertake a reform. But alas! too soon these hopes were blasted. His "well-meant but inconsiderate zeal" separated from him a number of the cardinals, who in July declared his election illegal and elected another pope, Clement VII. Both parties now looked to England for support, but the church there continued its adherence to Urban VI. Even Wiclif himself for a time was inclined to the cause of Urban, as we infer from one of his sermons somewhat later. But the conduct of the rival popes tended to confirm his former conviction, that the papal office was a nuisance, the "anti-Christ" of Scripture. He was now well on the way toward complete severance from papal adherence. The spirit of righteousness rose up within him and burst the bonds of partizanship. Each pope publicly, solemnly, and in God's name declared his opponent as "a false pretended pope," damned him as a schismatic, and Wiclif said that both were right in their judgments of each other. Everywhere, in scientific works, lectures, and sermons, he spoke out without reserve against the violence of both parties. Each, in demanding the death of the other and his supporters, practically admitted the right of every Christian to put his fellow Christian to death. Taking it all in all, Wiclif saw in the schism a providence to unbind men from papal fetters.

After the year 1381, after this immense change had taken place in Wiclif's mind, his work of *translating the Bible* was pushed forward with increased zeal and was completed probably in 1382. By this

instrumentality he hoped to spread the simple truth thruout the land. This was a labor directly for the people who had no Bible which they could read, but only learned what of its teachings they could from a bigoted and partizan priesthood. It was also no doubt between the years 1378 and 1382 that the training and sending out of his evangelical itinerant preachers began, for in the spring of 1382 they had roused the attention of the church judicatories. This was a work the importance of which it is not easy to estimate. Wiclif had already begun his attack upon the church doctrine. He must inevitably have been led into this by his stern appeal to Scripture as a criterion, assisted by his external freedom during the papal schism.

In the summer of 1381 he published twelve short theses upon the Lord's Supper and against transubstantiation as unscriptural, groundless, and erroneous. This was a step absolutely irreconcilable with the dogmas of the Romish church. Of course, it "produced a prodigious sensation in Oxford." The chancellor called together a council of twelve of the doctors of law and divinity who unanimously pronounced the substance of these theses to be erroneous and heretical; whereupon the chancellor drew up a mandate which did not mention Wiclif but condemned the doctrines and forbade their being taught on pain of dismissal, excommunication, and imprisonment. This order was read by the officers in Wiclif's own lecture room and in his presence, and it is said that at that very hour he was commenting upon the doctrine of the eucharist. Upon hearing it, he immediately stated that "neither the chancellor nor any of his colleagues had the power to alter his convictions." He appealed to King Richard II; but was obliged to refrain from lecturing on these subjects at the university. However, this did not stop his pen, and he continued to publish articles in both Latin and English against this doctrine. If his tongue was less free to give expression to his views from this time forward, history is made the richer and the cause was hardly retarded thru the untrammelled activity of his pen.

The year 1381 will ever be remembered in England for the terrible "Peasant War," a social revolution in which the peasants, to use the language of Jack Straw, one of their leaders, "would have ended by taking the life of the king, and by exterminating out of the earth all landholders, bishops, landed monks, endowed canons, and parish priests." Among the illustrious prey of this mob revolt was Simon Sudbury, archbishop of Canterbury, a man of sense and mild

character. The office was next filled by William Courtenay, bishop of London. This man was "a zealot for the papacy, an energetic and domineering churchman," and was the man who in 1377 had set on foot the inquiry against Wiclif. With his increased power he now began the work of crushing the constantly increasing strength of the Wiclifite party. His plan was first to condemn the doctrines and then attack and compel those who professed them to recant or be struck down without mercy. As soon as he received the pallium from Rome, he summoned to the Dominican Monastery in Blackfriars, London, an assembly of sixty orthodox ecclesiastical notables for May 17, 1382. During the session a terrific earthquake which shook the city was regarded by many of the members as an evil omen, and some were for giving up their design; but the archbishop was not thus to be outdone. He dexterously turned the frightening phenomenon into a good omen, and the deliberation proceeded. Wiclif afterwards denominated this gathering as the "Earthquake Council."

The result was a number of mandates from the archbishop, to which are appended twenty-four condemned "articles that had been in part publicly set forth in the University of Oxford, and in part spread abroad by itinerant preachers in the country." These mandates were thoroly published. This was the first step. To carry out the second was a far more difficult matter. It required the help of the state. Effort was made to obtain a bill from parliament, but upon failure of this a fraudulent royal patent was secured by which a persecution could be set in operation. Vigilant watch was kept over matters at Oxford by Dr. Stokes and others, commissaries of the primacy, and very soon we find Chancellor Rigge before the episcopacy in London to answer to a charge of heresy from which he cleared himself by abject submission and a promise to suspend Wiclif, Hereford, Repington, Aston, and Bedeman from university duties "until they should have purged themselves from every suspicion of heresy." He executed the charge, but remained of the same mind, as we see from his energetic interference in behalf of the Wiclifite party a few weeks later against the violent word attacks of a monkish zealot, Henry Crompton, by whom the party is first publicly called *Lollards*. To answer for this, Dr. Rigge is obliged to appear in London again, this time before the privy council. On July 1 of the same year Hereford and Repington were condemned and excommunicated.

Another royal patent led to the banishment from the university of "every member who receives, bears favor to, or has any intercourse with Dr. John Wiclif, Nicholas Hereford, Philip Repington, John Aston, or any one else of the same party." Besides this, all the halls and colleges were to be searched for books and tracts by Wiclif and Hereford. Since the first royal patent was issued the persecution of the itinerant preachers had been going on. Hereford, Repington, Bedeman, and Aston concealed themselves for some months; finally the last three were apprehended and one after another were brought to recant. Hereford went to Rome to place his case before the pope, who condemned his conduct and imprisoned him for life; but in 1385 he was unexpectedly released by a tumult in Nocera where the pope was besieged by King Charles of Sicily.

One leader only stood firm and independent in this period of alarm. In reading the different narratives one cannot suppress the query, why was not Wiclif personally demanded to recant or made to pay the penalty of his heretical daring? His "Articles" had been branded, and multitudes had suffered for their complicity; but the leader still preaches away to his parishioners at Lutterworth. Language had been exhausted in efforts to tarnish his honor and destroy his influence. Yet this "arch-heretic," this "anti-Christ," "still possessed the right of delivering lectures, conducting disputations, and preaching before the university." Perhaps it was conceived that when standing alone it would be easier to overpower him. In November, 1382, he received another call before a provincial synod at Oxford. Whether or not he went, cannot be definitely settled, but this much is known, that no recantation was made by him and no sentence was pronounced upon him. All things considered, it is most reasonable to suppose that the thought of parliament and the state of public opinion, dictated the politic discretion of Archbishop Courtenay. Just at the time of the meeting of the synod at Oxford, the parliament met at Westminster, and Wiclif presented to it a very carefully prepared memorial, which he hoped would lead to discussion. In this he sets forth for their attention four questions: (1) Monastic vows. (2) Exemption of the clergy and church property. (3) What view was to be taken of tithes and offerings? (4) That the pure doctrine of Christ on the Lord's Supper should be allowed to be publicly taught in the churches. The ground thoughts of the document are "the pure religion of Christ and Christian liberty."

WICLIF'S LAST DAYS.

He was permitted to live his last two years in comparative quiet and many-sided literary activity at his Lutterworth parish. Altho no longer surrounded by the old leaders, yet he did not want in these declining years for constant and confidential fellow-workers. The most noted and active of these were John Horn and John Purvey. During this period very probably were written the English sermons which have come down to us. About this time, when the preaching itinerancy was so menaced by the bishops, Wiclif more zealously undertook the task of instructing the people by short and simple tracts in the English tongue.

When Henry le Spencer, the bishop of Norwich, in 1383 roused the enthusiasm of the kingdom to furnish men and means for a crusade against the Clementines in France, to the extent "that the national wealth in so far as it lay in private lands was endamaged," Wiclif lifted up his cry in a Latin tract, "*Cruciata seu Contra Bellum Clericorum*." He compares the schism between the two popes to a quarrel of two dogs over a bone, and calls upon princes to take away the bone—i. e., the worldly power of the papacy—from both. So far is he from being intimidated that in the very next year after the archbishop's inquisitorial proceedings against him and his party, he inveighs in the most fearless and emphatic manner against both popes and the crusades advised by Urban VI, sanctioned by the archbishop himself, and headed by an English bishop; and, astonishing as it may seem, he even has the courage to address a missive to the primate in which he informs him that "neither the slaying of men nor the imprisonment of whole countries is the outcome of love to the Lord Jesus Christ." Wiclif had the "melancholy satisfaction" of witnessing the wretched failure of this disgraceful crusade against which he had warned the nation.

The story that he for a time went into exile in Bohemia has no basis. It seems to have been the conjecture of an Italian, Polydore Vergil in the first half of the sixteenth century, in order to explain Wiclif's relation to the Hussite movement of Bohemia. But this relation is much more easily explained as having been brought about thru the influence of Anne of Bohemia who came to England as King Richard's bride in 1382, and who is known to have been held in esteem by Wiclif, and to have sympathized with his designs.

The last years of his life he spent without a break in England, manfully urging religious reform, altho in constant peril. On the 28th

of December (Innocents' Day), 1384, while hearing mass in his church at Lutterworth, he suffered a second paralytic stroke, the first having occurred two years before. He was rendered speechless by this. Three days later, December 31, 1384, the brave, heroic and upright spirit of Johannes de Wiclif escaped forevermore the tyrannical bigotry of the Romish hierarchy. Far different, however, with his earthly tabernacle. The council of Constance in 1415 condemned forty-five of his "Articles" as heretical, false, and erroneous, and ordered that his bones be dug up and cast on a dunghill; and in 1428, after a rest of forty-four years, the venom and vengeance of Roman intolerance glutted itself when, in addition to the most diabolical anathemas, his remains were inhumanly unearthed, burned, and their ashes cast into the adjoining Brook Swift, from which, as Fuller in prose and Wordsworth in poetry have said, they were borne thru Avon into Severn, from Severn into the sea, and thus disseminated over the world.

"Wiclif is disinhumed,
Yea, his dry bones to ashes are consumed,
And flung into a brook that travels near:
Forthwith that ancient voice which streams can hear
Thus speaks—(that voice which walks upon the wind,
Tho seldom heard by busy human kind):
As thou these ashes, little brook, wilt bear
Into the Avon—Avon to the tide
Of Severn—Severn to the narrow seas—
Into main ocean they—this deed accurst
An emblem yields to friends and enemies,
How the bold teacher's doctrine, sanctified
By truth, shall spread thruout the world dispersed."

CHARACTER OF WICLIF.

Wiclif must be judged in the light of *his own times* and not by that of to-day. That feature or characteristic of the man which chiefly distinguished him in his own age was his intellectual preëminence. In this he is signally contrasted with Luther, who was so much a man of feeling. Both opponents and adherents "look upon him as having no living equal in learning and scientific ability." It was surely the proud consciousness of intellectual power which prompted him to say that "Since there are few wise men, and fools are without number, the assent of the greater part of mankind to an assertion only goes to show its folly." His sermons and discourses are frequently illustrated by mathematical, physical, naturalistic, and social ideas. The critical spirit of Wiclif was far beyond the average

for the period; and hence his frequent contemptuous utterances concerning the subtleties on which men dwelt so much, the usurpations of the papacy, the abuses of the hierarchy in general, and the foolishness of many particulars of Roman Catholic worship and doctrines. To furnish the complement of such a critical gift, there was needed a wise and holy zeal for the truth and honor of God, a high moral purpose, and a manly courage.

But the "center of gravity of Wiclif's personality" is found in his indomitable will. This often led him into what we would term unpardonable vehemence and abuse of his opponents, as when he speaks of the mendicants as "stinking orders," or taunts them with being descendants of Cain. As a writer, he is no artist. The unstable volcanic world of opinion in which he lived permitted no attempt at polish. He could only block out in rude contour the addresses, sermons, scientific works, and popular writings at which men of little charity in happier ages might smile. It was for him to tug at the wheels of reform in the steepest of the ascent, to infuse into others his earnest undissembled spirit, to serve his country, his God, and his Savior by bringing souls from the thralldom of Roman superstition into enlightened Christian liberty. "He clearly anticipated," says David Irving, "the most distinguished doctrines of the Protestants, and his opinions on certain points present an obvious coincidence with those of Calvin." Milton remarks in his *Areopagitica*, "Had it not been for the obstinate perverseness of our prelates against the divine and admirable spirit of Wiclif, to suppress him as a schismatic and innovator, perhaps neither the Bohemian Huss and Jerome, no, nor the name of Luther or of Calvin, had ever been known, and the glory of reforming our neighbors had been completely ours."

SUMMARY OF HIS REFORMATIONAL WORK AND INFLUENCE.

And now as to the work he accomplished and his actual part in the great development of Protestantism, the following seems clearly made out. The literary remains of Wiclif show a growth of thought between the earlier and later periods of his reformational efforts. In middle life they were of a mixed ecclesiastical and political complexion, in the last six years the political occupies the background and the religious is chiefly prominent. At first the papal usurpations upon the sovereign rights of the English crown; the financial plunder of the country for the Avignon court;

the secularization of the clergy, monasteries, and foundations; the practise of simony; and corruption of morals; were the only mischiefs which he saw and at which he struck by attempts at state legislation and administrative measures. In the last stage he dug deeper, and it was church doctrine as well as church life upon which his attention and efforts were exercised.

In his attack upon church doctrine he first clearly and learnedly emphasizes the fundamental "Protestant" principle that Holy Scripture alone is the infallible and absolute standard of truth. Next, he applies it to actual life by the institution of Biblical "itinerant preaching," by the English translation of the Bible, by scripture commentaries, and by popular tracts. His fiery zeal is now awakened and the dominant theology must be tested. The doctrine of the sacraments is examined, and in particular the article of transubstantiation in the sacrament of the Lord's Supper is overturned. He now pays his regards to the relations of Christ and the church. By his Scripture test, Christ alone becomes our Mediator, Savior, and Leader; and therefore is the only legitimate and governing head of his church. This last has been styled the *material principle*, and his "sole authority of scripture," the *formal principle* of Wiclif's theology. Surely here is sufficient refutation of the saying of Luther, that "Wiclif and Huss had attacked only the life of the church under the papacy, whereas he fought not so much against the life as the doctrine."

If we take a pre-Wiclif retrospect to the time of Hildebrand, and compare Wiclif with his precursors in the line of reform, we find that what Arnold of Brescia, what the Waldensian communion, what Francis of Assisi, what the Mendicant Orders, what St. Bernard and others had so devoutly sought to bring about—viz, "the return of the church of Christ to an apostolic life and walk"—burned in the soul of Wiclif in his early public labor. But in him there was added the modern idea of The State which he utilized toward the great object of church-reform; and besides there were his many superior conceptions of the growth of Christian doctrine.

His enemies claim that he comprehended in his person all previous "heretical notions," which is nearly synonymous with what Protestants would call *previous reforms*. Alzog, a recent Catholic historian of high authority, says (Univ. Ch. Hist. II, 947): "John Wiclif seems to have been a representative of every false principle of philosophy and every erroneous doctrine of theology current during

this age and thruout the church of the West." His doctrines were carried into Bohemia and became the origin of the Hussite movement. How potent his influence was felt to have been by his adversaries immediately after his time may be judged from the following words of Thomas Walsingham, a chronicler of that age: "On the feast of the passion of St. Thomas of Canterbury [a mistake, as it was on Innocents' Day], John Wiclif—that organ of the devil, that enemy of the church, that author of confusion to the common people, that idol of heretics, that image of hypocrites, that restorer of schism, that storehouse of lies, that sink of flattery—being struck by the horrible judgment of God, was struck with palsy, and continued to live in that condition until St. Sylvester's Day, on which he breathed out his malicious spirit into the abodes of darkness."

Against such bigoted and baseless innuendos the historic artist of to-day, at a point of distance five hundred years removed, contrasts the timely work of Wiclif, and the enduring substance of the latter completely overshadows the shifting mockery of the former. Professor Lechler of Leipsic, his latest, most appreciative, and by far most original and thoro biographer, admirably says of him: "In the collective history of the church of Christ, Wiclif marks an epoch. . . . He is the first important personality in history who devotes himself to the work of church reform with the entire thought-power of a master mind and with the full force of will and joyful self-sacrifice of a man of Christ." (John Wiclif, etc., Eng. ed., II, 347.) "John Wiclif appears to us to be the center of the whole pre-Reformation history. In him meet a multitude of converging lines, and from him again go forth manifold influences, like wave pulses which spread themselves widely on every side, and with a force so persistent that we are able to follow the traces of their presence to a later date than the commencement of the German Reformation." (The same, I, 14.)



WHY THE FARMER SHOULD STUDY ECONOMICS.

BY THOMAS ELMER WILL.

ECONOMICS is the science of the production, exchange, distribution, and consumption of wealth. Its subject matter is wealth; that is, narrowly, material goods that can be bought and sold; broadly, material goods that make for life. The end of this science is man. Man is a bundle of wants; an animated appetite. From his entrance upon the terrestrial existence until his exit he clamors and toils for food, raiment, shelter, art, literature, travel, experience—in a word, for satisfaction in one form or another; and each satisfaction realized but makes room for another demand.

Production is the process of calling into existence wealth to satisfy wants. Exchange is the process whereby each disposes of the wealth he can spare, and obtains in return a nominal equivalent from the wealth of others. Distribution is the apportionment of shares of wealth among the various individuals and classes in society, and to society itself. Consumption is the process of using wealth. The "good," having been produced, exchanged and shared, is here finally applied to the end for which it was created—the satisfaction of wants. The economic circle beginning with production ends with consumption.

Wealth production is of inestimable importance, for without it there could be no distribution, exchange, nor consumption, no civilized society, no human life. Our lives are largely occupied with efforts to produce wealth. Farmers' institutes, agricultural colleges, experiment stations, agricultural departments at Topeka and Washington, the agricultural press, and much of our legislation, state and national, seek to further wealth production. The slowness of civilization's march has been due in great part to the scarcity of goods, culminating at times in famine, followed by pestilence. But man is gradually getting the upper hand of nature. Wind, water, gravitation, heat, electricity, have been harnessed and put to the work of driving machinery, which man is left to tend; and tireless arms of steel are now performing, with ease, labor that would once have baffled the puny might of regiments and armies. The question which now confronts us is not so much, How shall we produce enough? but, Why is not the average man well-to-do?

If, as in primitive society, each producer received his identical product, and all of it, and population increased not recklessly but rationally, poverty would doubtless be rare. But each does not receive his identical product. With settled life comes gradually the division of labor, whereby each does the thing that he can do best. In consequence he possesses a surplus of his own kind of product, and suffers a dearth of all other kinds. This surplus he must exchange for a portion of other men's surpluses; and while "fair exchange is no robbery," it is not always easy, in our complex civilization, to know whether or not a given exchange is fair.

Again, modern industry is performed by labor, on land, reinforced by capital, and the whole is directed by "captains of industry;" laborer, land-owner, capitalist, and industrial captain, each demands his share. How do we know whether the sharing is fairly done, or whether some, by dint of might and privileged position, are seizing the lion's share?

Trading and sharing are so intermixed that either may be treated first, tho neither can be understood alone. Consider sharing first. What principles govern it? The old economists of our first half century solved the problem to their own satisfaction. Sharing they thought was governed by hard and fast natural laws; as the rainfall upon the watershed of central Europe is turned by the slope of the land and the force of gravity, a part thru the Danube into the Black Sea, a part by way of the Rhoné into the Mediterranean, and the remainder thru the Rhine into the North Sea, so the annual wealth product of a country was supposed to be diverted by an equally natural and inevitable process, a part thru the stream of rent into the coffers of the landlord, another portion by way of interest and profit (the two terms being confused with each other) into the till of the capitalist-employer, while the third share, by means of a naturally determined and unchangeable wages fund, emptied into the shrunken purses of the laboring classes.

These shares, be it observed, being determined by nature, were inevitable and right; tho idlers waxed rich and workers went in rags, to protest was as vain and impious as to protest against the distribution of a continent's rainfall or the movements of the tides or heavenly bodies. To this conclusion a single exception must be noted; namely, as regards the individual worker's share. Tho the portion for the workers' group was fixed by a law of nature, a given laborer's share was determined by the number of sharers; the

more workers in a group the less for each. Hence the average share might be increased by laborers making themselves scarce. Again it might be increased at the next annual division by the workers having produced a greater total volume of wealth.

Upon this theory, eminently satisfactory to those receiving the larger portions, modern "orthodox" economics has improved but little. At the same time the evolution philosophy has leavened modern thought elsewhere, and rendered the above absurd. The veriest schoolboy now talks of "the struggle for existence" and "the survival of the fittest." Modern biological science pictures a world-wide warfare; plant contends with plant for room and food; beasts fight with beasts for food and mates; civil and national wars are but illustrations of the same principle. Even in the world of ideas, the battles of the books and the giant wrestling of philosophy with philosophy illustrate the same process.

In the economic world, if anywhere, this fight is on. The struggle for place, whether by wage earners, office seekers, professional men, or others; the competition for trade by business men; the warfare between labor and capital; the mighty battle of the standards; and the strife between political parties over this or that economic issue and the right to rule—all are manifestations of this world-wide contest. And the careful and informed student of economics finds in this struggle-for-existence principle the thread that leads him thru the labyrinth of much of our economic life. In so far as practise is unmodified by sentiment, each, in the division of wealth, takes not what some indefinable and unchangeable natural law assigns him, but all he can get. The product for a given year being so much, the question whether wages shall be high or low depends principally upon whether laborers insist upon good wages and are so organized as to make their demands effective. Where laborers are apathetic or unorganized, employers need leave them little, if anything, more than will sustain life; and this ordinarily is what such laborers may expect. At the same time business profits will be relatively high.

Volumes have been written on the theory of value, with a view to ascertaining what makes it, and why it rises and falls. Some have thought it due to labor expended in producing the thing valued. Yet some things produced with great labor have no value, for example, spring poetry, or an invention that will not work; while some things not produced by labor, but given freely by nature,

possess great value, as a meteorite shot from the sky, or a vacant lot in a city; and some things once highly valuable lose their value, tho still apparently as good as ever, for example, a machine now out of date, or a last year's spring bonnet.

Why is this thus? Simply because "the value of a thing is just as much as it will bring." The seller takes all he can get for his commodity, and the buyer takes all he can get for his money. If ladies greatly desire the "love of a bonnet," or manufacturers greatly desire the machine, dealers can charge high rates, and do. When desire fails, value drops.

Adam Smith declared that "monopoly price is the highest that can be got;" while Kansas shippers discovered some time since that railroads "charge all the traffic will bear." What people have not clearly seen as yet is that monopolists and railroads are but following the ordinary business principle, whether that principle be applied to prices, wages, or to wealth distribution. Save where sentiment enters, "to each all he can get" is the law of the business world. Land rent in cities is to some a source of princely revenues; some city lands are worth millions of dollars per acre, actual computation having shown individual lots to be worth as much as the gold sovereigns which, placed on edge, would pave them. The rent equals the interest on the selling value of this land, computed at the prevailing rate. Whence comes this prodigious value? Not, as is sometimes supposed, from the labor spent on the land, for such land may be unused, and given over to weeds and rubbish. The value is simply the most any individual is willing to give for it rather than go without the money-making or residential advantages it represents.

Interest again, conceded by so conservative an economist as Boehm-Bawerk to be a "reward of idleness," an unfailing spring from which, without effort on the recipient's part, streams of revenue flow into the reservoirs of wealth; interest, denounced by Greek philosophers, outlawed by Moses, and by the Christian church until the modern industrial period; discussed in literature that, taken together, would fill a respectable library—what is it? Nothing more nor less than what the man wanting capital is willing to pay to the man possessing capital for the privilege of temporarily using and returning intact the capital in question. And when the borrower's need is great, the lender, calmly taking all he can get, may (as some pawnbrokers have actually done) force the rate to hundreds per cent.

Taxation, again, beautifully illustrates this principle. The re-

port of the Illinois Bureau of Labor Statistics for 1894 furnishes a mine of data which all careful study of taxation amply corroborates. An obscure back county is listed as possessing \$29 per capita of credits other than those of bankers and brokers; while Cook county, containing the city of Chicago, has but 43 cents per capita. Poor men's property is assessed high, per dollar of actual selling value; rich men's low; while millionaires' property is assessed lowest of all. Cook county shifts her taxes onto the other 101 counties of the state. Chicago shifts hers upon the outlying districts of Cook. Rich men of Chicago shift theirs upon poor men in Chicago; while the industrial monarchs of the city shift theirs over upon the shoulders of men less rich. Meanwhile Chicago assessors drawing moderate salaries revel in wealth.

So much for direct taxation. But direct taxation is fairness and honesty itself by the side of indirect. The dominating principle underlying indirect taxation, and the ground for the invincible popularity of this system among the privileged who understand it, are clearly revealed by the following remarks of the English prime minister, Mr. William Pitt, when considering in parliament methods for raising revenue to fight liberal ideas on the other side of the English channel. Said he:

My lords and gentlemen—To levy a direct tax of seven per cent is a dangerous expedient in a free country, and may excite revolt. But there is a method whereby you may tax the last rag from the back and the last bite from the mouth without arousing a protest; and that is to tax a great many articles of daily use and necessity so indirectly that the people will pay the taxes and not know it. Their grumbling will then be of hard times; but they will not know that the hard times are caused by taxation.*

If, now, our industrial life be indeed a warfare, what must be the fate of him who innocently believes the fable that all the beasts and birds are now at peace and governs himself accordingly?

But if the lion's share goes always to the strong, how can the system be bettered? I answer, the people themselves are the strong, if they but know it and use their strength that now lies dormant. And to them belongs the lion's share. According to our theory of government all power lawfully lies with the majority, and they may use it for their own betterment and that of the whole people when they will.

But how soon the people will use their power for their own good and that of the community at large depends upon the rapidity with which they become informed as to the ground facts of our indus-

*Quoted by William Lloyd Garrison in a speech on taxation.

trial system: Light on these facts is steadily spreading. An intelligent Englishman, visiting America and noting the contrasts in social well being among individuals theoretically equal, declared on returning that the most hopeful sign with us is the deep and widespread interest he observed in the study of economics. True, some dread the light, loving darkness rather. They deprecate the study of economics, and demand its exclusion from the curricula of our colleges. They assume that whatever is, industrially, is right; and forgetting the great law of change, which is the law of life, hold as public enemies all who demand material changes, however beneficent, in our economic adjustments. Yet such sentiments do not dominate in America. Our people desire the truth, and when sure they are right, they will go ahead.

What changes are desirable? In a word, the extension of democracy. The conception once universal of everything for the few is gradually giving way to that of everything for all. Our ancestors once believed in and tolerated monarchy; but now the name is as odious to us as was that of Tarquin to the Romans. People have held that the many should labor and the few enjoy; this idea found its embodiment in slavery; but recognized slavery in America is dead. We now believe that all should work and all enjoy. Time was when theologians taught that the few were foreordained to be saved and the many to be lost. We now believe that salvation is for all who will accept it. Education was once the exclusive privilege of the few; to educate the many was regarded not only impracticable, but dangerous. We now at public expense provide educational facilities for all, from country schoolhouse to university, and pass laws to compel attendance; while the daily newspaper brings the current history of the world to the humblest home. Once the many servilely groveled before the few; now we believe that any honest man is the equal of any other, and that a man's a man for a' that. We are steadily democratizing government, religion, education, social privilege and rank. The time will come when we will democratize wealth; when that which all aid in producing all will enjoy; when immoderate wealth and debasing poverty will disappear, and existence for the average man will be more than a mere struggle for bread.

But that these things may be, it is necessary that the people realize their resources and their strength; and that they learn how to adapt means to ends. That they may, I commend to them the candid and impartial study of economics.

A FROSTY MORNING ON THE CAMPUS.

BY HELEN J. WESCOTT.

THE golden dawn upon far mountain peaks
 Reflected; the still grandeur of wide snows
 Beneath the moon; the beauty of stacked fields
 When the night's queen full to the harvest grows;
 The splendid conflagration of the west
 When sunset burns there, and the rich, full-choired,
 Praise-freighted hymn of the home-turning birds
 Salutes it—these great poets have inspired.

Then is it meet for one who cannot send
 The swelling tones of genius throbbing high
 Thru all the notes, to sing a humble song
 Quite low, yet, haply, heard by those most nigh,
 Of one fair scene—fairer to partial eyes
 Than all the scenes that poets sing of? 'Tis
 Only our college campus, white with frost,
 To the bright morn up-smiling—only this.

Yet see! spreading to north and west and south
 Sweeps the wide turf; the warm, brown tints are veiled,
 Not hidden, by a veil of finer gauze
 Than ever bride was wed in. When Night failed
 Out of the east, she left this perfect gift,
 Her fairest work, that earth might greet the light
 With a new beauty. Now the dawn is high;
 She draws soft, purple shadows on the white

Of slope and hollow; gilds the gleaming boughs
 Of pine and fir tree; lays transfiguring touch
 On the chill white of every shrub and tree,
 As tho she loved each tiny twig so much:
 And in the distance she lifts up the hills;
 The changing, melting, purple-shadowed hills;
 Where every evening brings a new delight,
 And every morn what evening missed fulfils.

These circle all; and over all, the sky,
 Of that ineffable, deep-smiling blue
 That makes us wonder, looking upward, why
 Earth should be smiled on by so fair a hue.

Yet here we wonder not, for the bright earth
Gleams like an opal thru its veil of white,
With lovely tints—so fair, it may look up
Calm-shining, even in that heaven's sight.

We know that wide, free sweep toward the north;
We know the winding path, where the leaves fall;
And the broad belt of sunlight just before
You reach the pines—daily familiar, all;
And yet this scene that for each season wears
Some special charm to justify our pride,
Wins now a deeper tribute, touched with awe,
The face we know has been so glorified.



SOLDIERS IN THE SPANISH WAR.

THE College desires to collect the names of all students who were soldiers in the war with Spain. Inasmuch as many former students enlisted in various organizations and at different times, it was not possible to make any record of them for the College at the time; even students who were here in the spring term left College at different times and enlisted in various places. It is therefore necessary to collect the names singly from those who recollect them. All who see this list are requested to examine it and add to it any other names they know of soldiers in the Spanish War, whether volunteers or regulars, or sailors in the navy, who have at any prior time been students in this College.

Following is a list of students who joined Company H, Twenty-second Kansas Volunteer Infantry. This was composed of students from the three state educational institutions and two private colleges, and was known as the College Company:

First Lieut. H. M. Thomas.
Sergt. Abner D. Whipple.
Sergt. Homer Derr.
Corp. Harry Pratt.
Ernest M. Clark.
Samuel Dolby.
Hakon Hansen.

Roscoe R. Keeler.
Lot Parker Keeler.
Ray O. Porter.
Eugene V. Roe.
Lawrence M. Shearer.
Osborne P. Shearer.
John Wyse.

The following were students of the College during the spring term of 1898, and either left the College to enter the army or else enlisted at the second call immediately after Commencement:

Twentieth Kansas:

Emery S. Adams.
P. F. Fleming.
Sergt. Philip Fox.
Weston W. Shoffner.

Twenty-first Kansas:

Charles D. Montgomery.
Royal S. Wood.

Twenty-second Kansas:

First Lieut. G. R. Crawford.
Sergt. R. B. Mitchell.
Corp. George E. Martin.
Corp. Hans P. Nielsen.

Anthony Kolsky.
Albert Krotzer.
Walter J. Martin.
Merle Newell.
Rutherford B. Peck.
Harley L. Snodgrass.
Milton D. Snodgrass.
Royal A. Streeter.
Ernest W. Tague.
Leon H. Thomas.
Bolivar K. Walters.
Hervey W. Yenawine.

In addition to the foregoing, the following former students were in the army during the war:

Twentieth Kansas:

Judd N. Bridgman.
Corp. Chase Cole.
Corp. A. M. Ferguson.
Winfield E. Jackson.
Robert M. Lee.
Wm. B. McCord.
Ralph McDowell.
Homer Robison.

Twenty-first Kansas:

First Lieut. G. G. Boardman.
Sergt. L. C. Criner.
Charles R. Edwards.
F. H. Hunt.
Ralph Worden.

Twenty-second Kansas:

Corp. Foster Day.
Sprague Farmer.
George McDowell.
Charles M. Paige.
Corp. W. O. Strahl.

Twenty-third Kansas:

James Beck, jr.
Albert Porter.
Corp. Pearl Porter.

Other States:

Robert Garrett (California).

I. S. Martin (7th California).
Wm. H. Painter (7th California).
Douglas Morrison (Texas).
Albert Robison (2d Nebraska).

Regulars:

Corp. Grant Allen (Twentieth).
Wm. K. Blachly (Twentieth).
2d Lieut. W. A. Cavanaugh (20th).
Lieut. Frank A. Coe.
George Finley.
Ned M. Green (Sixteenth).
George Grimes (Twentieth).
Lieut. James G. Harbord.
Lieut. Eli A. Helmick.
John W. Holland (2d U. S. Eng.)
Capt. McGinnis (Rough Riders).
Sergt. O. G. Palmer (R. Riders).
Wesley O. Staver.
Capt. Albert Todd (artillery).
Second Lieut. Mark Wheeler (4th).

Hospital Corps:

Truman Allen.
Charles S. Evans.
Lew Hardy.
Elmer Hathaway.
Chris. A. Johnson.

A PLEA FOR OPPORTUNITY.

BY THOMAS ELMER WILL.

THE writer has stated in his official report that no part of his duties is so painful as the receipt of letters from earnest and ambitious youth eager for opportunity for study but destitute of means. At times the letters are written by parents or friends. Following is a letter recently received from the father of children desiring the advantages of an education in the Kansas State Agricultural College. So strong is this letter and so representative of other letters received that it is reproduced below save for the omission of names.

Hon. Thos. E. Will, President of K. S. A. C., . . . Kan., Jan. 1, 1899.
Manhattan, Kan.

Honorable Sir: Some months ago I wrote you from . . . Texas, the place near which I was brought up and which was my home for more than fifteen years. In reply to my inquiry you sent me a catalog of Kansas State Agricultural College. For this you will please accept from me many thanks.

About two months since with my wife and four children—two sons and two daughters—I arrived at . . . , Kansas, where my children are now attending school. I arrived here with eighty dollars (\$80) only. That money I have spent except two small bills which soon must go too. Professor, you may think I have wasted that money, but should God ever allow me to reach Manhattan, Riley county, Kansas, the place for which I left . . . , Texas, and to enter my four children into the K. S. A. C., the purpose for which I gave up my home, and a paying occupation in Texas, I will tell you better. One of my sons is fourteen years old and the other is nine years old. One is in class A, first grade, the other in class A, sixth grade of . . . schools which they now attend.

I have spent much time trying to impress upon the minds of my children the duty of developing themselves into good, wise and patriotic citizens and into industrious and useful men and women, and trying to teach them to acquaint themselves with the works of God that are to be found in the animal and the vegetable and the mineral kingdoms.

Both of my sons are anxious to graduate from the Kansas State Agricultural College. Their mother and myself are ready to make any sacrifice that may be required of us to help them secure such a schooling. I say to help them, because we are poor, and they, knowing this, are not willing to depend upon us for all, but want to help by working when not actually busy with school work. To do this we believe that it is best for us to settle in the town of Manhattan. We all will work at any honest work, however laborious it may be.

In Texas I taught school and preached the gospel and worked at the carpenter's trade and at gardening. In Kansas I shall go out of school teaching as I am sure that white teachers can do my race more good than I or any other colored teacher can do them.

□ Now, Professor Will, what I want to do is to assure you that I meant business when I wrote you to send me a catalog of your school, and to ask you

to favor us by helping us to secure work at Manhattan among your many white friends and colored friends residing in the town of Manhattan, Kansas.

If we can be blessed with health and employment we can, the Lord willing it, help our children thru that school and secure a Kansas farm for them in the meantime.

One of my sons has a great love for working at machinery, the other loves to examine plants and soils; both of them want to become farmers. If I can get work at Manhattan I will come there right away. I am your suppliant,

.....

What is the duty of the state in such cases? According to the old, individualistic philosophy, the state owes no duty to one desiring an education except to see that no one forcibly hinders him from securing it. If this philosophy is sound it applies to public education all along the line, from the college and university down to the common school. America, however, has long since repudiated this doctrine. It has adopted the free public school as an integral and cherished part of its social system. No sophistry about "taxing A to educate B's children" or "robbing Peter to pay Paul" produces the slightest effect upon American public sentiment. The duty of the state to educate, at least in the elements of knowledge, is conceded. The question is no longer in the field of controversy. To oppose the public school system is as vain as to oppose manhood suffrage, freedom of worship, or the right of petition.

And why are we entirely willing that A should be taxed to educate B's children provided A has none of his own? Because the matter is primarily not one of either A or B, their children, their tax-paying power, or their individual interests or desires. The matter is one of social well being, of the general good. Viewed from the standpoint of the aristocrat the case is well expressed in the declaration of an English parliamentarian when the suffrage was extended. Said he, "We must educate our masters!" Ignorance is dangerous, nowhere more so than in a republic where it expresses itself at the ballot box. Ignorance means demagoguery. It is the rank soil in which prejudice and superstition, anarchy and riot breed and fatten. No nation can afford it. No republic can endure it.

But the social good demands not only the banishment of ignorance and the diffusion of light; it demands as well the increase in skill and industrial efficiency on the part of its people. Why does England lead the eastern world? Because her workers are the most intelligent and skilful in the eastern world. Enlightened minds and trained hands make a nation industrially invincible. We may boast in Fourth of July speeches and Thanksgiving sermons that America

leads the world. She does, but she cannot rest on her laurels. She should continue to lead the world; and to this end her people must be trained to do the world's work better than any other people can do it. But other nations are learning from us the lesson of public education. They are establishing their public schools and teaching their children the mysteries of the three R's; and in addition they are establishing industrial schools and teaching their children to work efficiently. We have made a noble start in this direction, but it is only a start. There is no time for folding of hands or idle self-gratulations because of work already done, for while like the hare we rest, the patient, tireless tortoise may push past us.

What further step should we take? We must not only provide the schools, but we must make them in the highest degree effective. We must look upon money spent on educational institutions not as squandered upon luxuries but as invested at compound interest and at a high rate. Tho it reduce our war bills and navy bills, and even our liquor and tobacco bills, we must not skimp our schools. Tho we care nothing for the children, we must nevertheless care for the country they will lead forward or drag backward.

Further, we must disabuse our minds of the idea that in providing public, elementary schools we have done our full duty. If the first glinting of the sunrise of intelligence is a good thing, how much better the splendors of noonday! If the technical skill of the barbarian is so much better than no skill at all as to justify the state in paying for it, how much better the skill that can be furnished by a modern agricultural and industrial college, or an institute of technology! If it is now unthinkable that the state should not furnish public elementary school facilities to those who care to enjoy them, by what logic does it become improper for the state to furnish higher educational facilities? Where shall we draw the line at which state education ceases to be a good and becomes an evil? No man can draw it. The logic of the public school impels us, as rapidly as may be, to provide the completest education of which he is capable for every child and adult in society.

Again, and here we reach a vital point too little discussed, we must get the school and the boy together. What avails water to Tantalus or heaven to Dives in torment? And what avail the school and college to him who, like the son of the writer of the above letter, is kept from school by the fetters of poverty? Our splendid system of public instruction is a mockery and a mirage to the boy or girl

without money; and such is the average boy or girl. True, the average boy or girl derives some benefit from the public elementary schools, tho even such advantages are unattainable by many; but our colleges and technical schools, to say nothing of our universities and professional schools, are practically as far removed from many as tho located in the midst of Sahara. Their "gates are barred with gold," and their privileges are available only to the wealthy and the well-to-do, the fortunate and the few possessed of exceptional energy and will power.

Is it replied that these alone deserve a higher education? Then we repudiate our theory of free, public education. We admit that it is not desirable that we become educated as a people but that it is sufficient that a privileged minority of our people should become educated. This is the fundamental error. *As a nation* we must become enlightened and skilled if we would hold our own with other nations; and as a nation we must grapple with the problem of bringing Tantalus and the stream together.

What is the solution? First, we must make the work of education-getting as inexpensive as possible. Second, we must enable the needy student to earn his way thru college. Without serious cost to the state, student expenses may be cut to the bone. The chief items of student expense are board, lodging and books and supplies. Wholesome board can be furnished at cost by the state-supported educational institution at a figure materially below that charged by profit-makers; thru the college dormitory, furnished rooms can be supplied at cost to the needy and worthy, to be retained by them on good behavior, and here another heavy cut in student expenses can be effected; finally, books and supplies can be furnished at cost thru a college bookstore.

In an agricultural and industrial college the problem of furnishing remunerative employment to the student is easy of solution, provided the state is willing to stand behind the movement and do as well for her students as she does for her convicts. True, student labor viewed from a commercial standpoint may not in the first instance pay the state. The average student receiving ten cents per hour may earn less. But suppose he earn but seven cents or five cents while paid ten cents; what signifies this outlay when compared with the gain to the state from the vastly increased productive capacity, the higher intelligence and the added ability of the student to adapt means to ends and get things done instead of strewing his path with

failures? Suppose, further, these young people are left without the training the school can give: would it pay better to support some of them in reform schools and penitentiaries, others in alms houses and insane asylums and still others as tramps? For in some way, directly or indirectly, support them we must, or see to it that they become self-supporting.



THE ADMIRABLE RECORD OF REGENT VROOMAN.

ON January 6, 1899, Mr. Carl Vrooman, of Labette county, was confirmed by the senate of Kansas as a regent of the State Agricultural College—just in time for him to appear at the dedication of the Domestic Science Hall as one of the Board of Regents. A discussion at once sprang up as to whether Mr. Vrooman ought to have been appointed. Some of the newspapers denounced him as an anarchist and the “most conspicuously unfit man in Kansas” for the place. One paper charged that at the time of the Haymarket massacre Mr. Vrooman was one of the most “rampant anarchistic spouters” in the country and was arrested in Kansas City for making an incendiary speech.

The Kansas City *Times* presents the following statements in regard to our new regent's high qualification for the honorable and influential position to which he has been appointed.

Mr. Vrooman needs no defense among those who know him, but for the benefit of those who are not acquainted, it should be said that at the time of the Haymarket massacre Carl Vrooman was devoting his whole time and energy to learning the printer's trade at Quenemo, in Osage county. Up to this time he had never made a public speech in his life, or until three years later. He was never arrested or imprisoned in his life. He is charged with being a writer of “revolutionary books.” His contributions to the *Arena*, the *New Time* and other reform publications have won him an enviable reputation as a writer and thinker on reform topics. He has never written either a book or a pamphlet of a “revolutionary” or any other character.

Now as to the statement that Vrooman is “perhaps the unfittest man in Kansas” for the position of regent: Mr. Vrooman left Kansas several years ago to finish his education at Harvard university and in Europe, and the honors won by him at these seats of learning were such that no young man from Kansas ever made a record of which Kansans had a better right to be proud. He had been at Harvard only a year and a half when in open competitive debate he was chosen as one of the three fittest students in the entire student body to represent Harvard in her debate with Yale. On this occasion he won such dis-

tion for himself and his college that soon after he was considered the fittest man for the position and elected president of the Harvard Debating Union. Some months later, at the banquet following one of the debates at Cambridge, Mass., when toasts were responded to by such men as Francis A. Walker, president of the Massachusetts Institute of Technology, Carl Schurz, Professor James of the University of Pennsylvania, Thomas Wentworth Higginson, and several Yale and Harvard professors, Mr. Vrooman was selected as the fittest man, indeed, the only fit member of the entire Harvard undergraduate body, to respond to a toast. A few months later, when the Harvard men went down to New Haven to debate with Yale, at the banquet following the speaking, with Chauncey M. Depew as toast-master, and such men as Brander Matthews of Columbia College, Gov. D. Russell Brown of Rhode Island and Doctor Rainsford of New York present, he was again chosen as the fittest man to respond to a toast for Harvard.

In the spring of the same year, a league was formed of all the debating societies of the large eastern universities. A convention was held at Columbia College, New York, and this "perhaps unfittest man in Kansas" was unanimously chosen as the fittest of all the students of all these universities for president of this inter-collegiate debating union, and was so elected. Soon after this the Cliosophic Society of Princeton University, which has on its list of honorary members such names as Edwin Arnold and General Blair, elected Mr. Vrooman an honorary member — an honor never before conferred on an undergraduate student.

Mr. Vrooman went abroad the next year and was elected an honorary member of the Oxford Debating Union. Moreover, this "perhaps unfittest man in Kansas" for the position of regent had not been at Oxford two months until he was chosen as the fittest man among all the American students there to represent Oxford in her annual debate with Cambridge University. He was also selected as the fittest man to represent the American students of Oxford at the great international anniversary celebration of the founding of the French University of Lisle. After leaving Oxford, Mr. Vrooman visited the leading universities of France, Italy, Germany, Switzerland, Holland and Belgium. It would be hard to find a man in the state of Kansas who is better posted on college and university affairs the world over than is Mr. Vrooman. Not only is he a man thoroly and peculiarly fitted for the responsibilities of regent of the Agricultural College, but he is a young man whose whole career so far, from start to finish, has been a credit and an honor to the great state of Kansas. No mistake was made in the appointment of Mr. Vrooman. The high standard attained by the College in the last two years will be upheld and advanced.



CONTRIBUTIONS TO THE KNOWLEDGE OF THE COCCIDÆ.

BY T. D. A. COCKERELL AND P. J. PARROTT.

THE following series of articles results from some work done in the entomological department of the New Mexico Agricultural College early in 1899. The tables of species are by Mr. Cockerell, and the drawings by Mr. Parrott; while the descriptive notes, wherever based on newly studied material, are the joint work of both authors.

The known species of *Lecanium* are now so numerous, and the descriptions so widely scattered, that it becomes very difficult for the student to work on the genus unless he has quite exceptional facilities. It is hoped that the tables and notes here offered will in part remove this difficulty, and will indicate more precisely than previous publications the affinities of some of the species.

I. *Some species of Lecanium with legs and antennæ rudimentary, or sometimes absent.*

- | | |
|---|------------------------|
| Femalescale very convex, its height equal to or over half its length, | 1 |
| Female scale flatter; skin crowded with large glands..... | 10 |
| 1. Ground color yellow, peppered with brown or black dots, and blotched with brown or black..... | 2 |
| Dull yellowish or brownish yellow, with dull red patches.
(Australia, on <i>Acacia</i>)..... | leve, Mask., 1896 |
| Not so colored; usually uniform brown or blackish..... | 3 |
| 2. Scale $3\frac{1}{2}$ mm. long, 3 broad, 2 high; skin with numerous large gland-pits, and oval or circular large reticulated patches, as in <i>L. monile</i> . (Grenada, on <i>Citrus</i>). .. | punctatum, Ckll., 1895 |
| Scale $5\frac{1}{2}$ mm. long, $4\frac{1}{3}$ broad, $3\frac{1}{3}$ high; margin much pitted; a blackish dorsal longitudinal streak; skin with very numerous small oval glands. (Mexico, on <i>Citrus</i>). .. | townsendi, Ckll., 1898 |
| 3. Scale tuberculate..... | 4 |
| Scale not tuberculate..... | 6 |
| 4. Scale dark brown, with yellowish or greyish ridges dividing the dorsum into many small pits; dorsal tubercles 4 to 6, in a longitudinal row; length about $2\frac{1}{2}$ mm. (Australia, on <i>Dillwynia</i>). .. | pingue, Mask., 1895 |
| Scale reddish brown; prominences not confined to dorsal line; no pale ridges..... | 5 |

5. Scale very shiny; $5\frac{1}{2}$ mm. long, $4\frac{1}{2}$ broad, $3\frac{1}{4}$ high; embryonic larva with very large marginal spines, about 17 on each side. (Florida, on *Magnolia*).....*turgidum*, Ckll., 1897
 Scale clear, reddish-brown with a blackish margin; about 4 mm. long, 3 wide, 2 high (Mexico).....
*tuberculatum*, Twns. and Ckll., 1898.
6. Scale large, $8\frac{1}{2}$ mm. long, 6 broad, 5 high; very dark brown, shiny; skin with great numbers of minute speck-like glands, with fewer larger but still small ones interspersed. (Mexico).....*chilaspidis*, Ckll., 1897
 Scale medium, 5 to 6 mm. long..... 7
 Scale small, $3\frac{1}{4}$ mm. long, 2 broad, $2\frac{1}{4}$ high; brown-black, not very shiny; with minute specks of a lighter color, and irregular patches of dull white waxy secretion, especially at the sides; scale chitinous, remaining yellowish-brown after boiling. (Brazil, on *Nectandra*)...*perconvexum*, Ckll., 1898.
7. Scale hardly chitinous, transparent after boiling..... 8
 Scale well chitinized, remaining deep brown after boiling... 9
8. Scale 5 mm. long, 4 broad, 3 high; ochreous, often with a pinkish tinge, and irregular black spots or suffused blackish longitudinal bands; irregular longitudinal series of conspicuous pits; scale boiled in KHO turns the liquid crimson. (Florida, on *Pinus*).....*parvicarne*, Ckll., 1897
 Scale $5\frac{1}{2}$ mm. long, $4\frac{1}{4}$ broad, 4 high, or larger; light brown, rufescent towards margin; four dorsal longitudinal rows of pits, and many small pits at the sides; scale boiled in KHO gives a dark madder-brown color. (Mexico, on *Quercus*).....*tubuliferum*, Ckll., 1898.
9. Scale 5 to 6 mm. long, 3 to 4 broad, $2\frac{1}{2}$ to 3 high, *Eulecanium*-like, clear chestnut-brown; dorsum smooth and shining; two longitudinal rows of deep pits on each side in the subdorsal region, each row of 5 or 6 pits; sides (marginal area) broadly rugose, with small pits; anal plates triangular, the anterolateral side shorter than the posterolateral; anal ring with six long bristles; mouth-parts well formed but small, rostral loop short; tracheæ large and conspicuous; dermal glands small, some ramose; legs rudimentary, stout; trochanter with a long bristle; femur no longer than broad, with two short bristles; tibia and tarsus about equally long, very broad and short, tarsus with a

bristle on its inner side; claw stout but short, hooked; digitules rather long, filiform, hardly knobbed; antennæ rudimentary, cylindrical, broadened at base, rounded at apex, shaped much like the end of a finger, six vaguely defined subequal segments, apex with several bristles, a few scattered ones on the other segments. The legs are much as in *L. turgidum*. Larva of the ordinary type, but more elongated than usual, being fully twice as long as broad; two short bristles on each side in the abdominal region; last segment of antenna with a long bristle. (On small green branches of *Beloperone californica*, Benth., one of the Acanthaceæ, at Hermosillo, in the state of Sonora, Mexico, April 22, 1897, collected by A. Koebele, No. 1711; Div. Ent., Dept. Agric., No. 7928.).....

.....*sonorensis*, Ckll. & Parrott, n. sp.

10. Scale about 4 mm. long, oval; surface with a thin covering of waxy (glass-like) secretion; dermal glands brown. (Mexico, Texas, New Mexico.).....*imbricatum*, Ckll., 1896

Scale $4\frac{2}{3}$ mm. long, $4\frac{1}{4}$ broad, nearly $2\frac{1}{4}$ high; red-brown, shiny, with the segmentation more or less indicated by interrupted transverse blackish lines. (Trinidad, Brazil.)

.....*urichi*, Ckll., 1894

II. *Cryptes Baccatus* (Maskell).

Mr. James Lidgett having kindly sent good material of *Lecanium baccatum*, Mask., in both sexes, we were induced to give to it a critical examination. The material in question is from Victoria, Australia, on *Acacia melanoxydon*. Unfortunately no larvæ were in the lot, but a single larva was found among some *L. baccatum* received several years ago from Mr. Maskell.

It appears that *L. baccatum* is not a true *Lecanium*; it might possibly be placed in *Kermes*, but it could not rest easily there, on account of its larva and male sac. The larva resembles by all means that of a *Lecanium*, as Maskell states, but it has the sides well fringed with rather large bristles, in the manner of *Kermes*. The male sac is white, subcylindrical, closely felted; with a thin glassy operculum at the end, having in it a small aperture. This sac is entirely diverse from the male scale of typical *Lecanium*, but resembles more that of *Tachardia*. The adult female is globose, quite *Kermes*-like, but the legs and antennæ are fairly well developed.

From these considerations, it appears that the species may very well form the type of a distinct genus, for which the name *Cryptes* (Crawford MS., in Maskell, Trans. N. Z. Inst., XXIV, 21.) is available.

III. *A New Species of Gymnococcus.*

Gymnococcus ruber, Parrott & Ckll., n. sp.

Female. More or less pyriform, 6 mm. long and about 4 broad, soft, naked, slightly pruinose, with a very little white secretion on the under side; color dull terra-cotta red, very much the color of the larvæ of *Doryphora 10-lineata*, or of red modeler's wax. Surface somewhat shining. Segmentation obscure in adults, but very distinct in younger forms (3 mm. long) which are flattened, nearly circular in outline, and look like Maskell's figure of the adult female of *Dactylspius poæ*.

Boiled in KHO the insect gives a fine crimson color and becomes quite transparent, except that the legs, antennæ, anal ring and mouth parts remain brown. Skin with rather numerous small round glands, especially in the caudal region; these glands, focused up and down, sometimes look like short spines. In the cephalic region there are a very few true spines, small and slender. Anal ring very small, subcircular or oblong, strongly chitinous, with six very short bristles, in two sets of three, confined to the anterolateral parts of the ring; mouth-parts small the so-called mentum distinctly dimerous; legs and antennæ strongly chitinized; antennæ short and rather stout, seven-segmented, about 232 micromillimeters long; segments 1, 2, 3, 4, and 7 subequal, each about 33 micromillimeters long; 5 and 6 subequal (6 a little the shorter), each about 25 micromillimeters long; all the segments with some short bristles, those on the last three quite stout; legs fairly stout, especially the femora, coxa about 108 micromillimeters long, femur with trochanter about 150 micromillimeters, tibia about 92 micromillimeters, tarsus 100, claw about 33.

Hab.—In clumps of grass, hidden at the bases of the stems, at Mesilla Park, New Mexico, in the mesquite and *Atriplex canescens* zone, close to the Agricultural College, Jan. 17, 1899. (P. J. Parrott.) The grass is dry and without heads but Prof. E. O. Wooton says it is probably *Bouteloua eriopoda*.

This is the second species of *Gymnococcus*. The genus may be known by its soft naked body; highly-chitinized legs and antennæ, of the Eriococcine type, with the terminal antennal segment rela-

tively short, and the tarsus longer than the tibia; anal ring with six short bristles placed in two groups on its anterior lateral margins; and the absence of any anal lobes. Our species has no stout dermal spines, as Newstead figures for *G. agavium*.

IV. *The species of Lecanium which belong to the group Saissetia.*

Adult female scale flat, with perpendicular sides; 8 mm. long, 7 broad. (Mexico on *Castilleja*) *castilloæ*, Ckll., 1898

Adult female scale with one longitudinal and two transverse ridges, forming a raised **H**..... 1

Adult female scale rounded dorsally, without ridges forming an **H**, tho these are usually present in the immature form.. 2

1. Scale about 3 mm. long, light brown or pale reddish brown, the ridges with little patches of white secretion.....
 { *beaumontiæ*, Dougl., 1887, (Hort calid. Kew.)
 { *cassinia*, Mask., 1891. (New Zealand.)

(Douglas's rather inadequate description of *beaumontiæ* agrees exactly with examples of *cassinia* received from Mr. Maskell. If the species are different, nothing but a new description of *beaumontiæ* will show it.)

Scale larger, 4 to 5 mm. long, normally black or nearly so.

..... { ... *oleæ* (Bern., 1782) = *testudo* (Curtis, 1843.)
 { *palmae* (Haw., 1812) = *cycadis* (Boisd., 1867.)

(The name *testudo* appears to belong to the brown variety of *oleæ*. *L. palmae* (*cycadis*) is said to differ from *oleæ* by being more elongate, and having 9, instead of 8, antennal segments. We have never seen it.)

2. Scale small, usually not over $3\frac{1}{2}$ mm. long, never over 6; very convex, the height usually at least half the length..... 3

Scale of moderate size, 3 to 4 mm. long, oval in outline, convex but depressed, the height less than half the length..

..... *nigrum*, Nietn., 1861

(This is a variable species, but the skin is always very strongly reticulated, more strongly and uniformly than in the *coffeæ* group. Var. *begoniae*, Dougl., is short and dark; var. *depressum*, Targ., is more elongate than the typical form.)

Scale very large, over 10 mm. long, with more or less waxy secretion..... 6

3. Antennæ 8-segmented..... 4

Antennæ 7-segmented..... 5

4. Size relatively large, slightly over 5 mm. long
 *coffeæ* var. *hibernaculorum* (Boisd., 1867)
 Length about $3\frac{1}{2}$ mm.
 *coffeæ*, Walker, = *hemisphaericum*, Targ., 1867
 Rather smaller, margin rather flattened, sides with elevated
 lines; young scale white. (On ferns.)
 *coffeæ* var. *flicum* (Boisd., 1867.)
 Similar to the last, but margin not flattened, except ante-
 riorly, where it is produced and clypeiform; young scale
 white. (On ferns.) *coffeæ* var. *clypeatum* (Dougl., 1888.)
 (*L. clypeatum* is here for the first time reduced to a variety
 of *coffeæ*.)
5. Scale light brownish yellow or dull brown; legs smaller,
 femur with trochanter about 100 micromillimeters.
 (Ceylon, in nests of *Cremastogaster*.) ... *formicarii*, Green, 1896
 Scale light brown with a reddish tinge; legs larger, femur
 with trochanter about 150 micromillimeters. (Toluca,
 Mexico, on potato.) *tolucanum*, Parrott & Ckll., n. sp.
6. Scale 11 mm. long, 5 broad, 3 high; smooth, shiny, without
 pits. (Brazil.) *reticulatum*, Ckll., 1895
 Scale about 13 mm. long, about 8 broad, and 6 high; dorsum
 with 4 or six pits. (Australia.) *miripicum*, Mask., 1897

NOTE.—*L. ophiorrhizæ*, Green, from Ceylon, has a reticulated scale and may possibly belong to *Saissetia*, but it has not yet been fully described. *L. pater-soniæ*, Mask., and *L. casuarinæ*, Mask., resemble some species of *Saissetia* (viz, the section *Bernardia*, Ashm.) in their dorsal ridges forming a more or less distinct H, but they differ in other respects. *L. piperis*, Green, has also a median longitudinal and two transverse ridges. *L. anthurii*, Boisd., is unknown to us, unless it is one of the forms of *L. coffeæ*, as seems probable. It is of a light yellow color.

Lecanium tolucanum, Parrott & Ckll., n. sp.

Female scale 3 to 3.4 mm. long, 2 to 2.5 broad, 1.3 to 1.5 high, convex, rather pale brown with a reddish tinge; sides faintly malleate; surface with a rather dull sericeous luster. Compared with *L. coffeæ*, the scale is very different in detail; it does not have the numerous well-defined light points on a reddish ground, so characteristic of *coffeæ*; also, instead of being evenly rounded out, it is swollen centrally, with the ends more or less depressed, the lateral outline being approximately that of a very low cone, affording a transition from the *coffeæ* group to that of *nigrum*. The color is rather variable, but never dark. *L. formicarii*, Green, is not dissimilar; Green describes it as

dull brown, but examples received from the author are of a light brownish-yellow, and have shrivelled in drying, showing that they must have been rather soft. They are from 3 to 3.5 mm. long.

Reticulations. The characteristic *Saissetia* skin-markings are very distinct all over the hind part of the insect, but are not seen in the anterior part; so that if a specimen were divided, and each half mounted separately, one would take the anterior half to be that of a *Eulecanium*, and the posterior half to belong to *Saissetia*. In *L. coffeæ*, on the other hand, the reticulations are distributed all over the scale.

Effect of boiling in KHO. The scales give a brown color on boiling, and become rather pallid, but not colorless, the scale being well chitinized.

Legs and antennæ. These are slender and well developed. The antennæ have seven segments, tho sometimes there is an appearance of eight, due to a partial or complete division of the fourth. The digitules are long and filiform.

The following measurements (in micromillimeters) will help to separate *tolucanum*, *formicarii* and *coffeæ*. The *formicarii* is from Ceylon, sent by Mr. Green; the *coffeæ* is from ferns in a hothouse at Lawrence, Mass., sent by Mr. King.

ANTENNÆ.

SEGMENTS.	1	2	3	4	5	6	7	8	FORMULA
<i>L. tolucaum</i>	37-39	39-42	42	51	23-25	23	42	.....	4(37)21(56)
<i>L. formicarii</i>	25-28	34	34	28	20	23	39	.....	7(23)(41)65
<i>L. coffeæ</i>	42	42	53	42	39-42	28	26	39	3(124)(58)67

LEGS.

	Coxa.	Femur with trochanter.	Tibia.	Tarsus, with claw.	Claw.
<i>L. tolucaum</i>	115	149-147	115	115	16
<i>L. formicarii</i>	83	.99	74	57	..
<i>L. coffeæ</i>	94	149	115	83	12

L. tolucaum was found by Mr. A. Koebele at Toluca, state of Mexico, Mexico, Aug. 1, 1897, on the stalks of potato. (Koebele, 1699; Div. Ent., 7924.

THE OAT CROP.

BY F. C. BURTIS.

THESE pleasant spring-like days will have a tendency to make many think of oat seeding, so a few remarks along this line may not be out of order at this time. For the best development of the oat crop a cool, moist climate is needed, so Kansas does not rank very high as an oat-producing state. While Canada is raising 50 to 60 bushels per acre, on an average, weighing 35 to 45 pounds to the bushel, Kansas' average falls below 30 bushels and in many years below 20, and the grain is seldom of good enough quality to reach the standard of 32 lb without grading.

Many farmers discard the crop on this account, and it is well for the man to do so who is farming just to rob the soil of what he can sell off it in the form of grain, for when handled in this way the oat crop is not a money-getter. But to the man who is trying to keep up the fertility of his farm by a judicious system of rotation of crops, and consequently keeps stock to convert the crops into valuable products, the oat crop in Kansas, even if its poor yields could not be bettered, has a great value. It is one of the crops that is fairly rich in that compound *protein*, that has such great value in stock feeding, and is attracting so much attention from the farmers to-day. The shrewd feeder values oats for all classes of stock, but feeds it judiciously, uses it to give variety and help make the balanced ration from the feeds raised on the farm. He goes to the expense of threshing but little of his crop, for it was harvested while in the dough stage and the straw is worth as much as prairie hay, and for many classes of stock it is a very economical way to feed the grain in the sheaf.

If the oat crop is seeded in proper season it can be removed in time to make room for many catch crops, as sorghum, fodder corn, soy beans, cow-peas, rape, and wheat or oats for fall pasture. If the ground has been plowed in the spring, a good disking will put the stubble in shape to receive most of these crops. When properly handled and utilized it will pay and pay well to raise oats in Kansas, and the progressive farmer should not be without a small patch in his list of crops the coming year. He should not be discouraged because he cannot obtain the yields of Scotland, Belgium, or Canada, but go about to better the present results, which I believe can be done in many cases.

During past years this station has carried on quite extensive experiments with the oat crop as to varieties, time of seeding, preparation of the seed bed, amount of seed per acre, selection of seed and treatment of diseases, etc. The results would indicate that no variety or method of treatment would prevent an almost total failure at times; but that there is much to be gained by proper selection of varieties, seed, and treatments in most cases.

I will comment on these results very briefly, and any one wishing details may obtain them by writing to our secretary for bulletins Nos. 63 and 74.

VARIETIES.—Nearly two hundred varieties have been under trial, and some of them for seven years. We find that no one variety is superior to all others one year with another, but that there are quite a number of good varieties and that they are very superior to a large number of other varieties in our list. The cardinal point in our best varieties is that they mature early. Color cuts no figure, for all colors are found in our best list and in our poorest list. Our good varieties do not seem to run out if the seed is selected with care from year to year, and the fine heavy seed from the north generally gives us poor results the first year and is not superior to our well established varieties. No variety is rust proof, but the earlier the variety the less it will be damaged by this pest. The following are some of our best varieties and longest tested: Belgium, Brown Winter, Board of Trade, Red Georgia, Pedigree Red Rust Proof, South Carolina Black. The phenomenal yields claimed by seedsmen for any variety will not materialize in Kansas; steer clear of such advertised varieties. It will pay well to give a good round price for a start in good seed oats; but this can often be found among your neighbors, and when you once obtain it you can keep it with proper selection and grading of seed, and importation of seed will not be often necessary.

TIME OF SEEDING.—This is the most important point, as there is more loss due to late seeding than to any other cause. In this locality, for each succeeding week after the middle of March that oats are put into the ground the yield will be two to four bushels less per acre. Seedings made as late as the middle of April will yield only half as much as those made before the middle of March. The early seedings generally escape the damaging effects of rust while the late ones as a rule are almost destroyed by it. Very seldom do oats damage by freezing if not seeded earlier than the first of March.

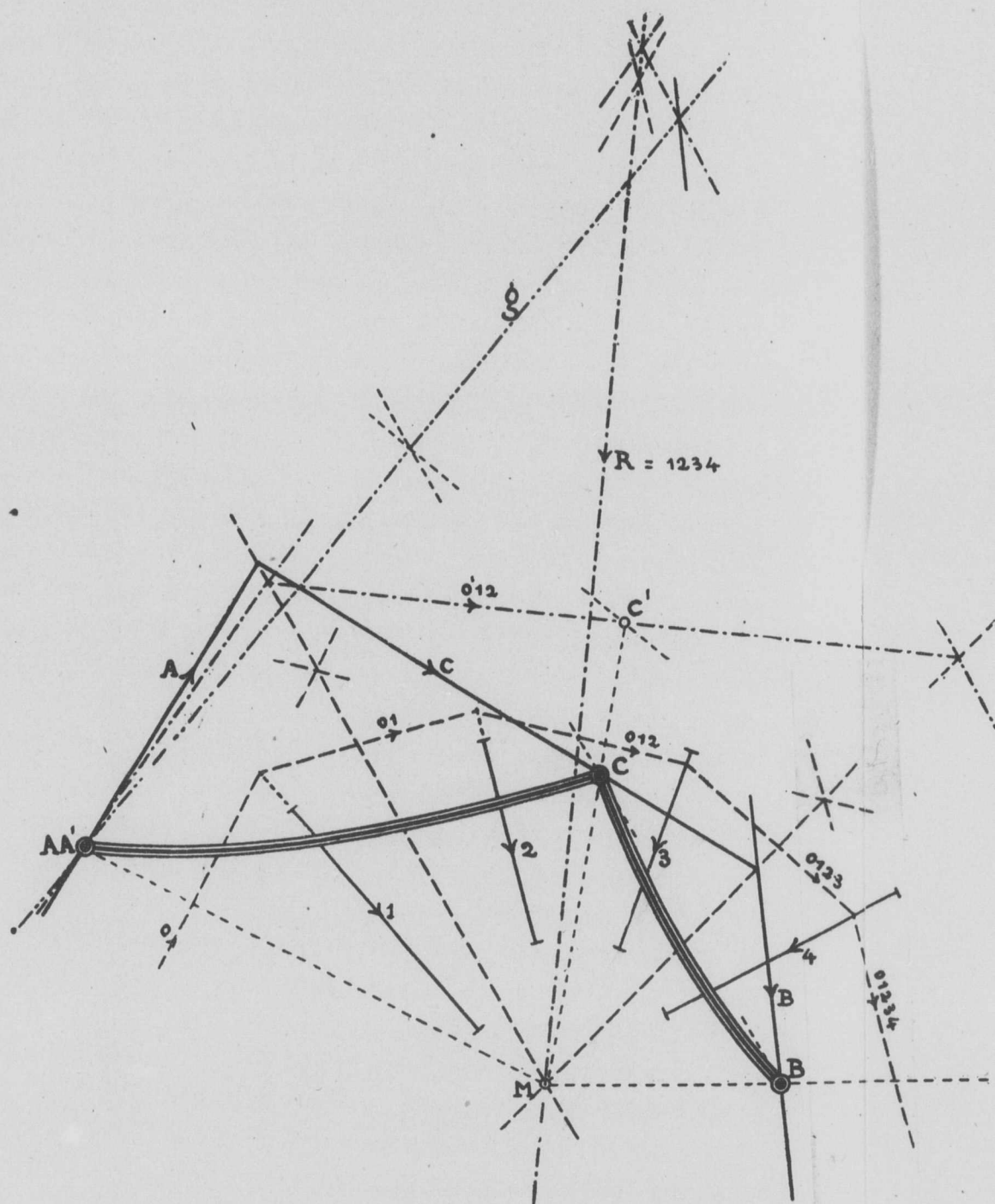
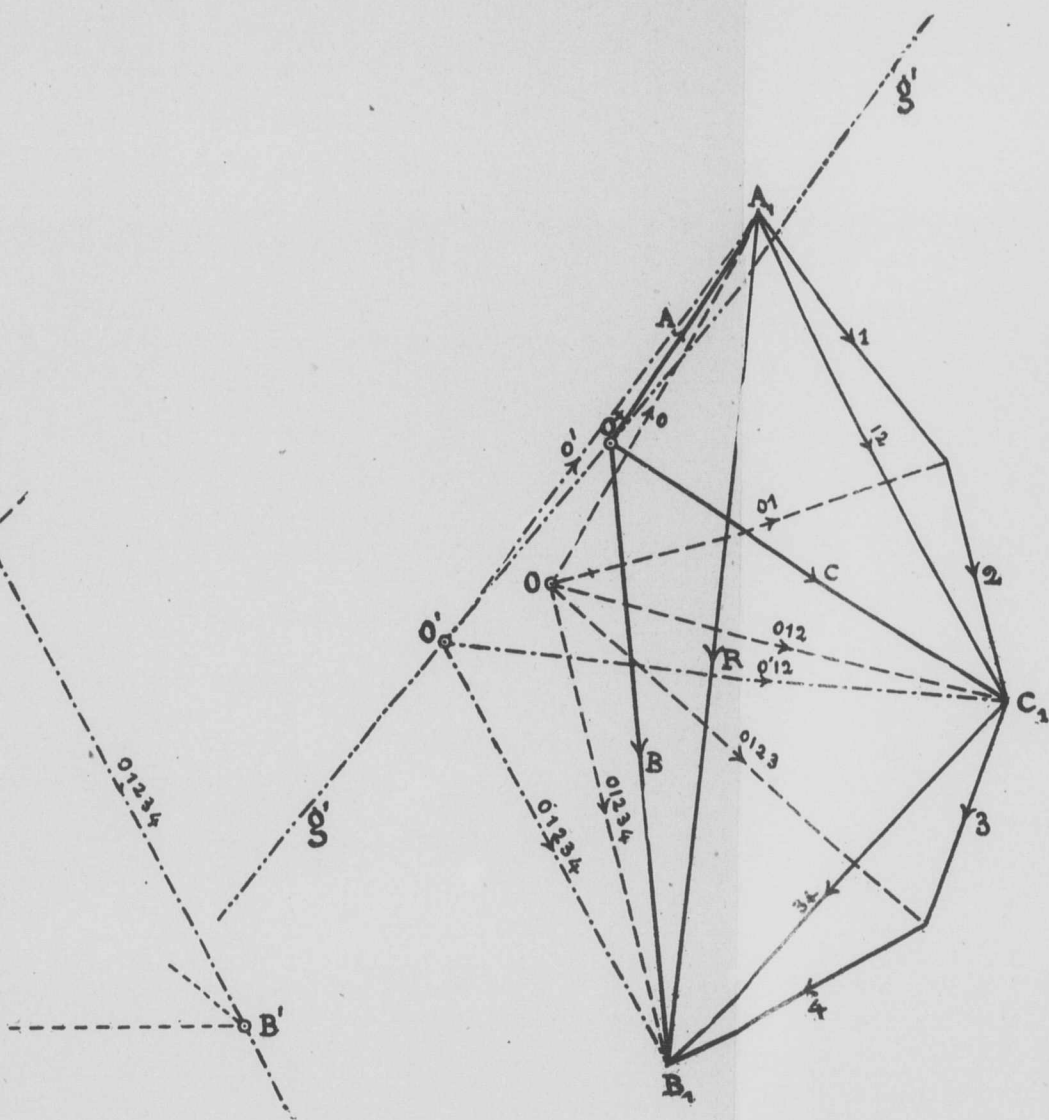


FIG. 1.



SOME APPLICATIONS OF MODERN GEOMETRY IN MECHANICS.

BY ARNOLD EMCH.

III. Polygon of Forces and Funicular Polygon.

IN the previous article the theorem has been stated that the sides of two corresponding funicular polygons of the same system of forces in a plane intersect each other in points of a straight line and that the two figures representing the polygon of forces and the funicular polygons are reciprocal.

2. The value of this theorem will appear from the solution of the following problem.

Two bars, AC and BC, connected by a pivot-point at C, are supported by pivots at A and B (fig. 1). Two forces, 1 and 2, are applied to the bar AC, and in the same manner, two forces, 3 and 4, to the bar BC. To find the reactions at the points A, B, C.

First determine magnitude, direction, and position of the resultants (1 2) and (3 4) of the forces 1, 2 and 3, 4 by means of the polygon of forces (fig. 1b) and the funicular polygon (fig. 1a). Then, construct the funicular polygon of the resultants (1 2) and (3 4) with O' as a pole and with its first side passing thru A. Every funicular polygon constructed in this manner will be collinear with regard to every other, and with regard to the point of intersection M of (1 2) and (3 4) as the center of perspective collineation. Now it is clear that the polygon passing thru A, C and B, and formed by the reactions at these points, is also a funicular. It is therefore collinear to the first polygon (O' , $O'12$, $O'1234$). Projecting the points C and B from M upon the funicular sides ($O'12$) and ($O'1234$), respectively, the projected points C' and B' will correspond to C and B in a perspective collineation. Hence the lines BC and $B'C'$ will intersect each other in a point S of the perspective axis g. By this point and the point A the axis is determined.

The directions of the reactions at A, C and B intersect the funicular lines O' , $O'12$, $O'1234$ in points of the line g, respectively, so that they may easily be drawn. To find the magnitudes of the reactions, draw lines parallel to their directions thru the points A_1 , C_1 , B_1 , respectively. These lines necessarily meet in a point O_1 of the straight line g' . Thus $O_1 A_1$, $O_1 B_1$, $O_1 C_1$ are the magnitudes of the reactions at the points A, B, C, respectively.

3. The use of the polygon of forces and the funicular polygon is mostly limited to statical problems. Kinematical problems, however, which are connected with the effect of a couple of forces, can be solved in a beautiful manner by these polygons. As an example I shall treat the case of *rotation in a plane*.

A couple of forces consists of two parallel equal forces of opposite directions. The constructing of the force and funicular polygon of a couple shows that it is equivalent to an infinitely small force with an infinitely distant point of application. If there is no resistance to a couple, its effect will be a rotation. The forces which produce a rotation and which, consequently, can be reduced to a couple, may be considered as a number of equal forces whose lines of action form a regular polygon with the same number of sides. In fig. 2 it has

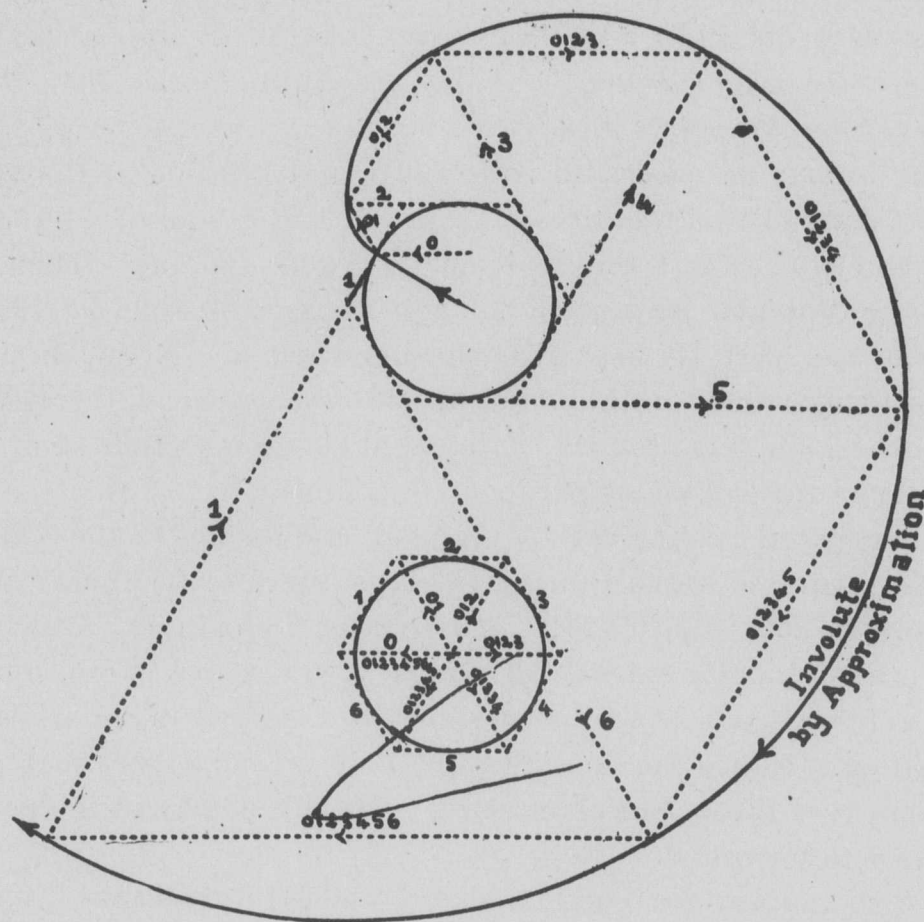


FIG. 2.

been assumed that the rotation results from six equal forces acting along the sides of a regular hexagon. The polygon of forces will also be a regular hexagon, and its center O may be taken as the pole of the polygon of forces. In this case the forces 0, 01, 012, 0123,

01234, 012345, 0123456 will all be equal, and 0123456 coincides with O. Drawing the funicular polygon in fig. 2, it is noticed immediately that its extreme sides O and 0123456 are parallel. Hence, the point of application of the resultant, which is zero, is at infinity. This result confirms the remark, that a couple of forces may always be considered as an infinitely small force with an infinitely distant point of application.

Suppose now that the division of the forces of a couple into a number of forces, acting along the sides of a regular polygon, is indefinitely increased. In this case the lines of action become elements of a circle, and also the polygon of forces will be a circle. The forces O, 01, 012, ... of the latter are radii of the circle. From fig. 2 it is seen immediately that *the funicular polygon is now an involute of the circle*, which contains the lines of action. The normals of the involute are the lines of action produced. In every portion of the involute and the corresponding normal the strain will be the same. This result may be stated in the theorem:

The funicular polygon of a plane rotation may always be considered as an involute of a circle.

4. The principle of this funicular polygon appears in a clear and instructive manner from those mechanical appliances in which a uniform rotatory motion is transformed into a uniform translation, or a parallel motion. As an example may be mentioned the automatic bobbin winder of a sewing machine. Here the transferring curve consists of two Archimedian spirals forming a *heart cam*.

A direct application of the theorem stated above is shown in fig. 3. In this mechanism a uniform circular motion is transformed into a rectilinear periodical motion with uniform speed.

The bounding edge of the cam is an involute of a circle (dotted circle in figure) which by turning about C as a center, in the direction indicated by the arrow, shifts the pulley A towards A', in a line perpendicular to the involute at A. The parallel motion of the part ADEB in the direction of AA', or A'A, is established by the condition that the axis of the piece DE has to slide thru the fixed points C and G. The limiting position of the pulleys and the cam in their motion to the right is indicated by A' and B' and the dotted involute. This position is reached after a rotation of the cam about C thru an angle of a 180° . If from A' the rotation continues in the same sense, the piece ADEB will immediately begin to move in an opposite direction. The pulley B' will be pushed towards B so that B'B is

parallel to $A'A$. After another rotation thru an angle of 180° the involute cam and the piece of the parallel motion will have returned to

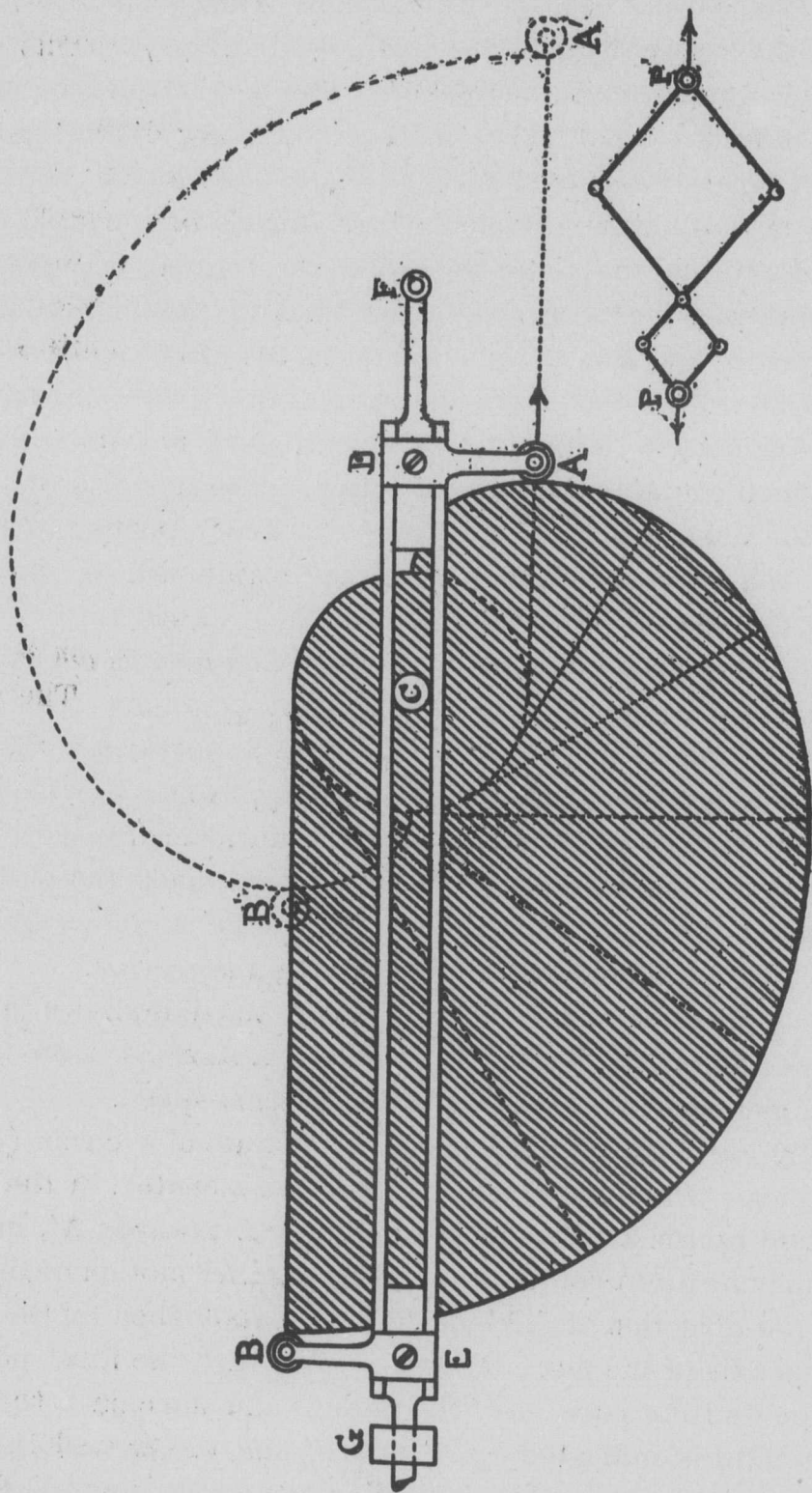


FIG. 3.

their original position, the left extreme, from which the motion had started.

In the first place let an ellipse represent the funicular polygon of a system of forces which all pass thru the center of the ellipse. In order to find the polygon of forces, the ellipse and the lines of action of the system may be considered as the orthographic projection of an elliptical cone. It is known, however, that the polar figure in space is also a cone. To the generatrices of the first correspond the tangents of the base of the second cone, and vice versa.

From this it is seen that the polygon of forces is also an ellipse. Every pair of conjugate diameters of one ellipse is parallel to a certain pair of conjugate diameters of the other. The two ellipses representing funicular and force-polygon are therefore similar and can be brought into a similar position, as illustrated in fig. 4. To the line of action P corresponds the tangent P' of the polygon of forces, and to the force P corresponds the element ds . To the force O of

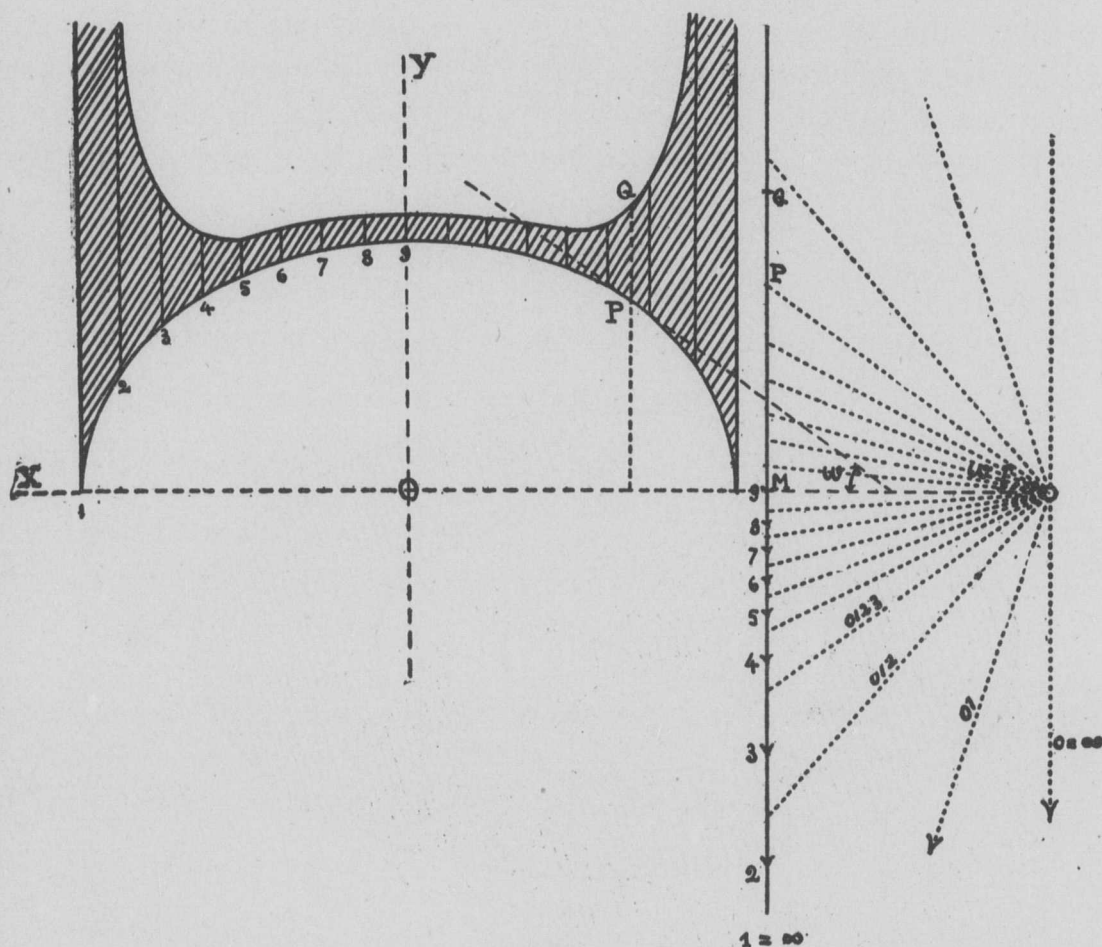


FIG. 5.

the polygon of forces corresponds the tangent O' of the funicular polygon. Thus, the forces forming the funicular polygon are proportional to the semidiameters of the polygon of forces. As the cor-

respondence between the two ellipses is reciprocal it follows from this that the forces of the given system are proportional to the semi-diameters, or diameters, of the funicular polygon. It may also be said that the given forces are proportional to the segments of the diameters intercepted by the two ellipses. They form a system of central pressures distributed over an elliptic vault.

6. When the forces are parallel the funicular polygon is reduced to a straight line parallel to these forces. In fig. 5 the direction of the forces is supposed to be perpendicular to the major-axis of the

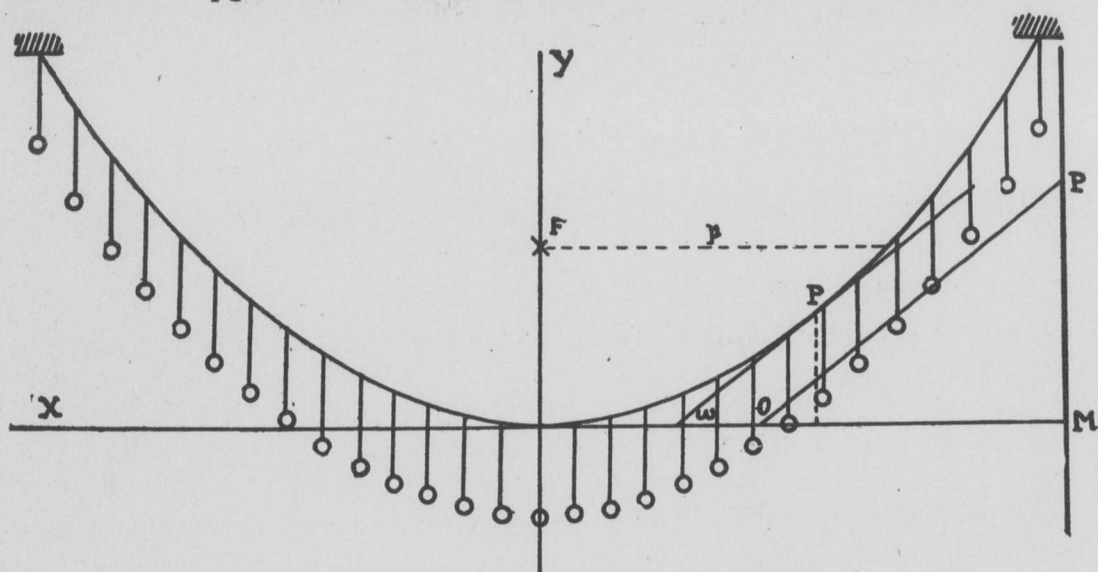


FIG. 6.

ellipse. To make the construction as simple as possible the forces have been placed at equal distances. In this manner the ellipse becomes circumscribed to a polygon (funicular polygon). The approximate size of the forces can easily be obtained by drawing lines thru the pole of the polygon of forces parallel to the sides of the funicular polygon. If at every point P of the ellipse a distance PQ equal to the force acting at this point is drawn, the upper extremities of these distances will form a curve which gives a clear impression of the magnitudes of the forces. The segments of the lines of the action between the ellipse and this curve are proportional to the corresponding forces.

To obtain an accurate expression for the forces let

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$$

be the equation of the ellipse. At a point $P(x_1, y_1)$ the tangent is determined by

$$\frac{xx_1}{a^2} + \frac{yy_1}{b^2} = 1,$$

or

$$y = -\frac{b^2 x_1}{a^2 y_1} x + \frac{b^2}{y_1},$$

hence from fig. 6

$$\tan w = \frac{b^2 x_1}{a^2 y_1} = \frac{b x_1}{a \sqrt{a^2 - x_1^2}}.$$

The force at P varies like $\tan w$, since $PM = OM \cdot \tan w$. For an increase dx of x , the increase of PM will be

$$OM \cdot \frac{d(\tan w)}{dw} dw,$$

Or after an easy calculation

$$\frac{OM \cdot ab \cdot dx_1}{(a^2 - x_1^2) \sqrt{a^2 - x_1^2}}.$$

For the unit increase of x the increase of OP will be

$$\frac{OM \cdot ab}{(a^2 - x_1^2) \sqrt{a^2 - x_1^2}}$$

This expression gives the relative force at P.

It can be verified without difficulty that the equation of the curve referred to above is

$$y = b^2 \left(1 - \frac{x^2}{a^2}\right) + \frac{OM \cdot ab}{(a^2 - x^2) \sqrt{a^2 - x^2}}$$

As a last example of this kind we will consider a system of parallel forces whose funicular polygon is a parabola. The principle of construction is exactly the same as in the previous case. From the projective properties of the parabola it follows that all forces of the system are equal. It represents the parabolic catenary, fig. 6. The same result is obtained by considering the equation

$$x^2 = 2py$$

of the parabola. The tangent at P (x_1, y_1) is

$$xx_1 = p(y + y_1), \text{ or}$$

$$y = \frac{x_1}{p} \cdot x - y_1.$$

The increase of MP is proportional to the increase of x_1 . The relative force PQ is therefore constant.

8. In space the position of the resultant of a system of forces in a general position cannot be found by a funicular polygon as in the plane. The magnitude and direction of the resultant, however, is found by means of a polygon of forces in exactly the same manner as in a plane system. Fig. 7 contains a sketch of a pile-driver* and

*In central Europe, where crude manual labor is comparatively cheap, this machine is used frequently in driving piles for the foundations of buildings. The weight of the driver is about 600 lb, which requires from 16 to 18 workmen to operate it.

the polygon of the forces which act in such a machine. For the sake of simplicity it is supposed that all forces are equal and have the same point of application A, so that their lines of action form the edges of a regular pyramid. *The vertices of any polygon of forces that may be constructed lie evidently on a helix of one thread.*

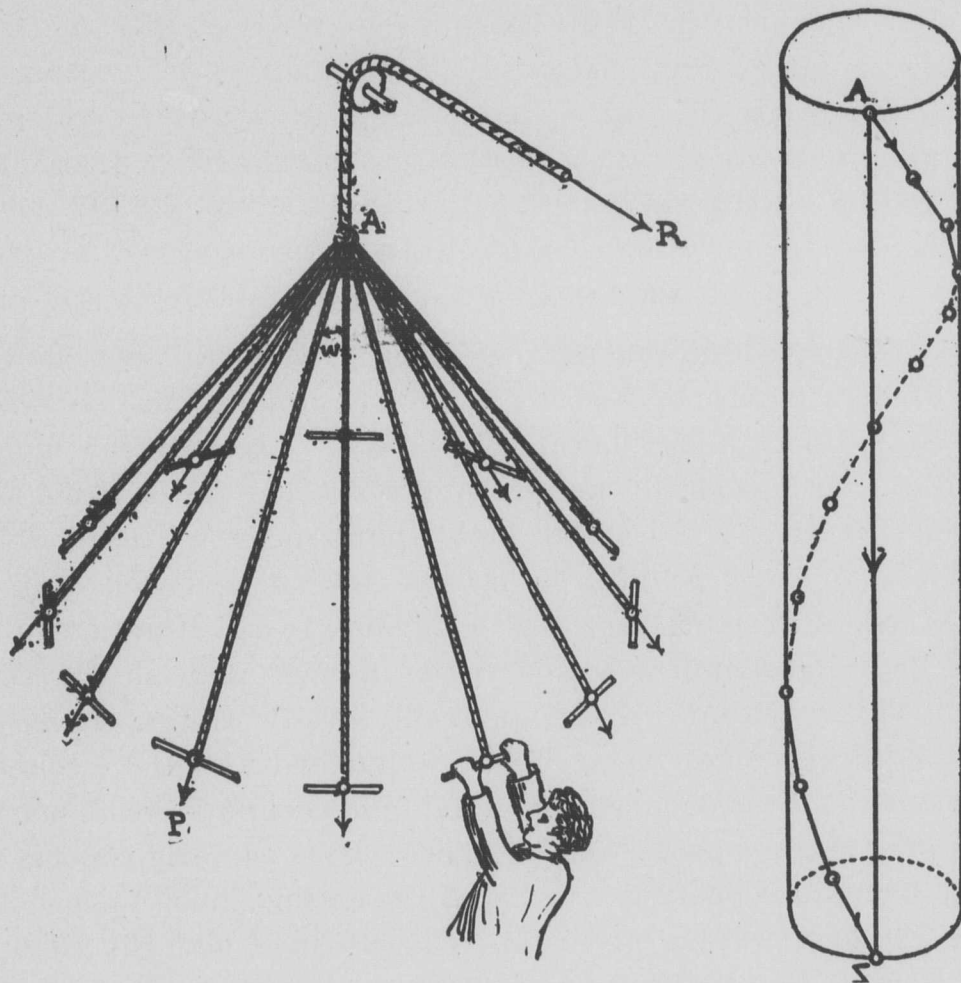


FIG. 7.

If the angle formed by each force P with the axis of the pyramid is designated by w , and if there are n forces, the radius r of the cylinder containing the vertices of the polygon of forces will be

$$r = \frac{P \sin w}{2 \sin \frac{\pi}{n}}$$

and its height

$$h = nP \cos w.$$

The resultant, $R = AZ$, is an element of this cylinder and is therefore

$$R = n \cdot P \cos w.$$

This result can, of course, be found without reference to a polygon of forces. The latter, being inscribed to a helix, is the interesting feature of the problem. For $R=600\text{ lb}$, $n=17$ and $w=30^\circ$, $P=40.8\text{ lb}$.*



MAKERS OF THE KANSAS STATE AGRICULTURAL COLLEGE.

BY JOHN D. WALTERS.

VIII. Hon. F. D. Coburn.

THE frontispiece of this number of THE INDUSTRIALIST shows a life-like picture of Hon. F. D. Coburn, the efficient secretary of the State Board of Agriculture of Kansas. There are few men in the West more generally known and respected. His name is a household word in Kansas, and he is known in every state in the union and in every country in Europe for the excellence of his official reports—reports that have done more to call attention to the varied and almost infinite resources of Kansas than all the boom editorials ever written. In his quiet and sturdy way he arouses as much enthusiasm over the agricultural, horticultural and live-stock achievements of the West as Homer did in his songs over the martial achievements of his people and his times. His quarterly reports are waited for as anxiously as the family magazine, and his peculiar graphic style of writing about the “Kansas Steer and His Sister,” “The Helpful Hen,” “King Corn,” etc., never fails to fascinate and enthrall his rural readers.

Mr. Frank D. Coburn was born in Jefferson county, Wisconsin, in May, 1846. His paternal ancestors were of the straight New England Yankee stock. He has followed the footsteps of a great many strong men of his country and generation; taught in a country school, borne arms in the defense of his country's flag, been a farmer, split rails, migrated to Kansas, took a claim, and edited newspapers—the *Kansas City Live Stock Indicator* especially, for about six years. When he became secretary of agriculture, in 1881, for the first time, he was a farmer and stock-raiser in Franklin county, Kansas,

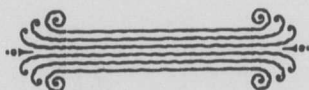
* Articles 3, 4, and 8 of this paper were written in French, originally, and the author used them as examples in his course of graphic statics given at the Polytechnic of Bienne, Switzerland.

beginning there as a farm hand upon his discharge from the army. He has been elected secretary four times—the last two by acclamation.

When President McKinley was looking about for a man for secretary of agriculture, the friends of Mr. Coburn enthusiastically urged his name for the position. He became the candidate of the stockmen and farmers of the great West. Among his endorsers, irrespective of political color, were the Kansas Improved Stock Breeders' Association, the Kansas Swine Breeders' Association, The Oklahoma Stockmen's Association, the Kansas City Live Stock Exchange, the Kansas Editorial Association and the Kansas State Board of Agriculture. Last summer, Mr. Coburn was asked by many prominent republicans to become a candidate for the governor's chair; and, in spite of his modest request to be left in his present position, he developed surprising strength in the convention.

Mr. Coburn deserves a place among the prominent "Makers of the Kansas State Agricultural College" for many reasons. He was a regent of the institution from 1883 until 1885, during a most critical period of its history, and served as president of the board and as chairman of the farm committee during the entire period. His faith in practical education, as taught here, is attested by the fact that three of his children, a son and two daughters, have graduated from this College. His counsel has been sought constantly and freely for nearly two decades by all boards of all political complexions. Many of the most valuable experiments of the College Experiment Station have been suggested by him, and the practical value of many of them has been doubled by the publicity which his energetic pen has given them.

Public institutions, as well as individuals, are in need of friends who will advise and counsel, encourage or warn.



VIEWS OF ONE MILLIONAIRE ECONOMIST.

BY THOS. E. WILL.

THE writer has expressed the opinion that the views advanced by professors of economics in colleges and universities were too often determined by pecuniary considerations rather than by the facts. That the rich have in cases sought to rule, not simply in industry, politics and religion, but in science, is beyond contradiction; and that professors in colleges have too often stood not as exponents of the truth, the whole truth and nothing but the truth, but as brief-holders for those upon whom their colleges and universities depend for their very lives, is lamentably true. That the wealthy, however, are uniformly actuated by sordid self-interest and that their utterances and the dicta of the college chair are always class utterances only is happily not true. Friends and leaders of the people have not infrequently been those whose personal and class interests were directly opposed by their own teaching.

A striking illustration of the above is furnished by the case of Prof. E. R. A. Seligman, of Columbia University, New York City. Professor Seligman is a member of a wealthy New York family and is reputed to be the only millionaire professor of economics in the United States. His devotion to economic science led him, it is said, practically to donate for a time his services to Columbia University. He is a leading American authority on taxation and holds to the doctrine of Adam Smith that each should be taxed according to his ability to pay, rather than in inverse ratio to his ability to evade. At and before the time when recipients of large incomes were thrown into a fever over the recent federal income tax law Professor Seligman was publishing strong papers in defense of the principle of the progressive taxation of incomes, well knowing that his own income must, under such a system, come in for its share of tax. He also favors a progressive tax on inheritances.

The latest advanced utterance of this wealthy economist which has come to the notice of the writer is the following quotation which appeared some months since in the special public ownership edition of the New York *Independent* and is about to be issued as a tract by the National League for Promoting Public Ownership of Monopolies, an organization of which such men as Washington Gladden, Supt. E. Benj. Andrews, Thomas Wentworth Higginson, Edward Everett Hale and Governor Pingree are vice-presidents:

THE FIVE STAGES.

In all the media of transportation and communication there seems to be a definite law of evolution. Everywhere at first they are in private hands and used for purposes of extortion or profit, like the highways in medieval Europe, or the early bridges and canals. In the second stage they are "affected with public interest," and are turned over to trustees, who are permitted to charge fixed tolls, but are required to keep the service up to a certain standard; this was the era of the canal and turnpike trusts or companies. In the third stage the government takes over the service, but manages it for profit, as is still the case to-day in some countries with the post and the railway system. In the fourth stage, the government charges tolls or fees only to cover expenses, as until recently in the case of canals and bridges, and as is the theory of the postal system and of the municipal water supply with us at the present time. In the fifth stage the government reduces charges until finally there is no charge at all, and the expenses are defrayed by a general tax on the community. This is the stage now reached in the common roads and most of the canals and bridges, and which has been proposed by officials of several American cities for other services, like the water supply.

Obviously, if Professor Seligman's law of evolution holds good, and it is but an aspect of the law of monopoly as stated by Professor Ely of Wisconsin University and Prof. Adolf Wagner of Berlin, foremost leaders in economics in America and Europe, the results must in time be far reaching. Public ownership and operation, *gratis* to the user, of railroads, street cars, steamboats, telegraphs, telephones and all other media of transportation and communication must necessarily follow. Free vertical transportation in the elevator of the twenty-story city office building is already here. According to Professor Seligman's principle, free horizontal transportation is on the road, and we or our descendants may yet indulge in the privilege of railroad rides with no expense greater than that now incurred by the public servant or other person who is privileged to ride on a pass. Two cents will now convey a letter from Maine to California. In accordance with the above principle the time will come when the stamp on our letter will be as needless as were the stamps on bank checks and other commercial paper before the Spanish war, and the ordinary man may yet send a telegram or a telephone message to a neighboring city without feeling that by so doing he consumes half a day's wages.

True, these things have been pointed out many times before. Yet some may be interested to know that the future is thus foreseen by at least one economist of national repute and a man to whom railroad fares and telegraph, telephone and postal charges are not serious burdens.

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THE INDUSTRIALIST.

Published ten times per year by the Printing
Department.

KANSAS STATE
AGRICULTURAL COLLEGE.

Manhattan, Kansas.

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THE WHITE MAN'S BURDEN.

RUDYARD KIPLING has written a poem entitled, "The White Man's Burden," evidently called forth by the colonial development of the United States. This poem has attracted wide attention. Following are extracts published by courtesy of *McClure's Magazine*, in the February number of which the poem appeared:

Take up the White Man's burden—
Send forth the best ye breed—
Go, bind your sons to exile
To serve your captives' need;
To wait, in heavy harness,
On fluttered folk and wild—
Your new-caught sullen peoples,
Half devil and half child.

Take up the White Man's Burden—
The savage wars of peace—
Fill full the mouth of Famine,
And bid the sickness cease.

The ports ye shall not enter,
The roads ye shall not tread,
Go, make them with your living
And mark them with your dead.

By all ye will or whisper,
By all ye leave or do,
The silent sullen peoples
Shall weigh your God and you.

CIVICS ANALYSES.*

MADE UNDER THE DIRECTION OF PROFESSOR PARSONS.

Kansas I. Suffrage and Elections.

(A) THE SUFFRAGE.

FULL suffrage belongs to any adult male† who (1) is a citizen of the United States or has declared his intention to become such, and (2) has resided in Kansas 6 months, and in the township (or district) 30 days next preceding the election, except he be—

†Women have municipal suffrage (city & school officers & school bonds.)

There is no educational or property qualification in Kans.

Such persons cannot vote or hold office in Kansas until their disabilities are removed by a two-thirds vote of all members of both branches of the legislature.

- (1) under guardianship;
- (2) of unsound mind;
- (3) convicted of felony, unless restored to civil rights;
- (4) guilty of bribery (giving or receiving or offering to give or receive a bribe);
- (5) guilty of defrauding the Govt. of the U. S. or of any state;
- (6) dishonorably discharged from the U. S. service, unless reinstated;
- (7) guilty of bearing arms against the United States, or voluntarily aiding in the attempted overthrow of the Govt., unless he has been honorably discharged, since April 1, 1861; from the U. S. military service after having served at least one year.

Besides the disabilities above enumerated the constitution specifies two other causes which disqualify one for holding office but are not named as causes of disfranchisement:

- (1) A person who gives or accepts or knowingly carries a challenge to fight a duel, or goes out of the state to fight a duel, shall be ineligible to any office of trust or profit.
- (3) A person who gives or offers a bribe to procure his election shall be disqualified from holding office during the term for which he may have been elected.

(B) ELECTIONS.

The Australian Ballot Law was adopted in Kansas in 1893 (Session Laws, chap. 78, p. 106). It is intended to secure secrecy and

*This matter appears in its present form for the convenience of the Civics Department; capitals being used in some cases for emphasis, abbreviations for rapidity and condensation, and indentation for analytic effect.

fairness and undoubtedly helps to protect the ballot from fraud and intimidation.

Under this law the ballots cast in city elections for *city purposes*, are paid for by the city. All other ballots whether cast in township or city (for national, state, district, township, or county officers) are printed and distributed at the expense of the county.

Nomination papers for state officers and officers for districts larger than a county must be filed with the Secretary of State; for city officers, with the City Clerk; for all other officers, with the County Clerk.

[For the method of making and signing nomination papers by individuals, or caucuses, conventions, etc., see the Australian Ballot Law, chap. 129, Session Laws, 1897, §§ 4-7, or chap. 52 (Art. IV, p. 542.) Gen. Stats. '97.]

Another law of 1893 (chap. 77) prohibits bribery and all corrupt practises at elections (including the giving away of liquors or cigars on election day by a candidate or his agents), requires each candidate within 30 days after the election to file with the county clerk a sworn statement of all moneys loaned, paid or promised to be paid, by or for him, to secure or further his election. (Penalties, fine or imprisonment. See Gen. Stats. '97, vol. I. p. 578.)

General elections are held on the Tuesday next succeeding the first Monday in November, and include national, state, district, county and township officers.

In even years there are elected U. S. Reps., State Reps., Gov., Lieut.-Gov., Sec. of State, Treas., Atty.-Genl., State Supt. of Pub. Instructn., (State Supt. of Insurance, State Printer, State Rd. Judges and Solicitor)¹ and a Justice of the Supreme Court. Also a County Commissioner, Co.-Atty., Co. Supt. of Pub. Instructn., Probate Judge, and a District Court Clerk in each county. Every fourth year District Judges, State Senators and Presidential Electors are voted for.

In the odd years are elected one County Commissioner, Sheriff, Coroner, Co. Clerk, Co. Treasurer, Register of Deeds, and Co. Surveyor.

Each township elects annually a Trustee, a Clerk, a Treasurer, a Road Overseer for each Road District in the township, and as

¹Laws passed at the Special Session provide for the election of the officers named in the above parenthesis, which will probably occur in 1900 if the said Session is held valid. (As we go to press we learn that the Supreme Court has sustained the Special Session.)

many Constables as there are Justices of the Peace, which latter officers (2 or more to a township) are elected each alternate year. City elections for city officers are held on the first Tuesday in April in 1st and 2d class cities, and on the first Monday in April in 3d class cities.

In 1st class cities one councilman is elected from each ward every year, and every two years a mayor, city clerk, treasurer, attorney and police judge are elected.

In 2d class cities the mayor, city clerk, street commissioner, city marshal, and one councilman from each ward, are elected every year, and a treasurer, police judge, 2 or more justices of the peace, and as many constables, are elected every two years.

At 3d class city elections a mayor, clerk, street commissioner, police judge, city marshal and 5 councilmen at large, are elected each year.

For the board of education in all the cities see "City Analysis" or Kansas III.

School District elections occur in the school house at 2 P. M. on the last Thursday in July. The officers are a director, clerk and treasurer, and one of them is elected each year for a three-year term.

U. S. Senators are elected by the Legislature under rules prescribed by Congress (for which see Legislative Handbook, 1899, p. 25, or Canfield p. 130, or Gen. Stats. Kans., '97, p. 135, or 14 U. S. Stats. at Large, p. 243.)

A majority is necessary to elect a U. S. Senator, but in all other elections above mentioned a plurality is sufficient.²

Registration of voters is not provided for in country districts, but in the cities voters must register each year in the office of the city clerk, or in the office of the Commissioner of Elections if the city has over 30,000 population.

For *manner* of voting see Gen. Stats. of Kans., 1897, vol. I, pp. 551-3. Election districts and polling places:

²The law says, "In all elections for the choice of any officer, unless it is otherwise provided, the person having the highest number of votes for any office shall be deemed to have been elected to that office." (Gen. Stats. Kans., '97, p. 559.) This has been construed in the Atty.-Genl's office to apply the plurality rule even to School District Meetings, and the words sustain that construction. It would seem, however, that the wording of the law is considerably broader than the reason on which it is based. In popular elections at the ballot box where considerable added expense or complexity may be necessary to secure a majority choice, there is some excuse for adopting the plurality rule. But in elections by assembly, or any body of persons who meet to elect an officer, it would seem both proper and practicable as a rule not to base a choice on less than a majority of those voting at a lawful meeting of a quorum. And in special cases, such as the election of a U. S. Senator or a State Printer in joint session of the Legislature, the express provisions requiring a majority of all the members elected to both houses, appear to be clearly justified.

In a city each ward, or a fraction thereof, constitutes a voting precinct. The city is divided into election districts or precincts by the Mayor and Council except in such cities of the first class as may have a Board of Supervisors of Elections (consisting of the Metropolitan Police Commissioners^a plus the Commissioner of Elections) in which case the said Supervisors divide the city. (See Gen. Stats. of Kans., 1897, vol I, p. 390.)

Each township constitutes an election district with one polling place unless the Co. Commissioners divide it into two or more districts.

It is the duty of township trustees, and the mayors and clerks of cities, to provide suitable polling places.

Three judges of election and two clerks are appointed for each polling place by the township trustee in case of township districts, and by the Mayor and Council in case of city districts, except where a Board of Supervisors of Elections exists (see above) in which case such board appoints the election judges and clerks.

By a law of 1897 one judge and one clerk must be taken from each of the two political parties polling the two largest votes at the last election, and the remaining judge from the party polling the next largest vote, the appointees from each party to be selected in accordance with the recommendations of the central committee of that party.

The poll-books are signed by the judges and attested by the clerks. In general elections one poll-book and the ballots are taken by one of the judges to the county clerk. The other poll-book goes to the township trustee or the city clerk.

In city elections the ballots are taken to the city clerk who keeps them one year.

Canvassing Boards:

The county commissioners, canvass the votes for county and township officers and determine the results of such elections. They also canvass the votes for State and District Officers, members of the Legislature, Congress and Presidential Electors and certify such canvass to the Secretary of State.

The Gov., Sec. of St., Auditor, Treas., Atty.-Genl., or any three of these officers constitute a State Board of Canvassers to examine the election returns sent up from the counties.

^a The Special Session has repealed the Met. Police Laws. (See note 1 and Kans. II.)

The city council constitutes the board of canvassers for the city elections.

None of the canvassing boards can go behind the returns. They merely see that the returns are in proper form, the vote correctly added up, etc.

Contested elections are determined—

For state officers, district judges or members of the senate, by the state senate;

For members of the house, by the house;

For county officers, by a court consisting of the probate judge and two disinterested persons selected by him;

For township officers, by the county board of canvassers;

For city officers, by the mayor and council—

(at least in 1st class cities—no provision has been found for contests in 2d and 3d class cities, but the mayor and council as the city board of canvassers, and by analogy with 1st class cities, would seem to be the natural arbiters);

Bond, property-transfer, and county-seat elections are tested by the district court;

For presidential electors, by the state board of canvassers;

For U. S. Representatives by the Natl. House;

For U. S. Senators, by the Natl. Senate.

Certificates of elections are issued—

To state officers, national representatives, and presidential electors, by the secretary of state under seal of his office;

To county and township officers, by the county clerk (who acts as clerk of the county board of canvassers);

To city officers, by the city clerk under the seal of the city, and signed also by the mayor.

Kansas II.

The second analysis in the Kansas series is a tabulation of state, county, township and district officers, including judges and members of the legislative bodies. The mode of selection, term, bond, remuneration, general nature of business, and specific functions are shown for each office and board. The table is a valuable one but is too wide for THE INDUSTRIALIST page.

CIVICS ANALYSES.

[Made under the direction of Professor Parsons, Kansas S. A. College.]

KANSAS II. Officers, including Judges, Legislators, and Administrative Officers

Except in Cities (for which see "City Analysts" Kansas III) and some State Institutions, Penal, Educational, Etc. (for which see Kansas IV.)

OFFICERS.	HOW CHOSEN	TERM	PAY†	BOND	GENERAL NATURE OF BUSINESS	SPECIFIC FUNCTIONS
1 Governor A (Memb. 1 Ex. Coun. 2 Brd to Ex. Treas. 3 St. Brd Canvass'r 4 St. Brd Agri.)	Elected by voters of State	2 years	\$3,000		Chief Executive	1. Commander-in-Chief of militia. 2. Pardoning power; death warrants must have his signature. 3. Veto power. 4. Appointing power and power of removal. 5. Sends message to legislature each session reporting condition of state and suggesting legislation; may call extra session. 6. Represents state in dealings with national government and other states, and is general agent to represent the state in business affairs.
1 Lieut.-Governor B (Chm St. Brd Rd. Assessors.)	"	"	\$700+\$6 a day during legislative sittings		Pres. of Senate and Vice-Governor	1. Calls senate to order and presides over it. 2. Acts as Governor in case of Governor's death, impeachment, resignation, removal or disability. (Sickness or absence from state is not such disability.)
1 Secretary of State C (Memb. 1 Ex. Com. 2 Brd to Ex. Treas. 3 St. Brd Canvass'r 4 St. Brd Rd Assess. 5 St. Brd Equaliza'n 6 Sch. Fund Com. 7 Brd Agri. 8 Charter Board*)	"	"	\$2,500	\$10,000	Charge of State papers	1. Keeps state records, enrolled bills and resolutions of legislature, official bonds, etc. 2. Custody and distribution of state laws. 3. Administers oaths and attests with state seal. 4. Issues certificates of election on behalf of state board of canvassers (see Kans. I Elections) 5. Calls House to order and supplies lists of members elect. 6. Issues requisitions on state printer for printing required by any officer or institution of Kans. subject to approval by Att'y Gen. and State Treas. 7. Sees to publication of session laws and proposed amendments to constitution.
1 Auditor (Memb. C 1 to 5 inc. above and Register St. Land Office.)	"	"	\$2,500	\$10,000	Chief Book-keeper	1. Keeps state accounts, audits accounts of public officers. 2. Approves claims and issues warrants on treasurer for same.
1 Treasurer (Mem. C 1,3,4&5 above)	"	"	\$2,500	\$1,000,000	Treasurer	1. Receives and has custody of state monies and pays claims.
1 Attorney General (Mem. C 1,3,4 & 6 above & Charter Brd. *)	"	"	\$2,500	\$5,000	State Counsel	1. Prosecutes or defends suits in which the state is a party, acting as attorney for the state. 2. Gives legal advice to state officers and county attorneys.
1 Supt. Pub. Instruc'n (Mem. C 1 & 6 above and St. Brd Ed.)	"	"	\$2,000	\$10,000	Educational Executive	1. Visits county schools at least biennially. 2. Distributes state school fund to counties. 3. Publishes school laws. Advises Co. Superintendents.
1 Executive Council	Composed of all foregoing officers except Lieut.-Gov.				Aids Chief Executive	1. Has charge of state property not otherwise provided for. 2. Elects board of railroad commissioners.* 3. Shall approve official bonds given by state officers. 4. Shall award contracts for state stationery and supplies, and names official state paper. 5. Shall remove state printer for neglecting public printing, upon conviction by court.
State Board of Railroad Assessors	Composed of Lieut. Gov., Sec. St., Treas., Audr., Atty Gen.				Assessing Rd. Property	Meets 1st Monday in April to appraise and assess at its actual value all railroad property in the state.
State Board of Equalization	Composed of Sec. St., Audr., and Treas.				Equalizing Taxes	Meets 2nd Wednesday in July to equalize county assessments and apportion state taxes.
State Board of Examination	Composed of Gov. Sec. St. and Audr.				Inspecting Treasury	1. To examine at least once a month, without notice, accounts and assets in treasury. 2. To designate a New York bank as state fiscal agent.
State Board of Canvassers	Composed of Gov., Sec. St., Audr., Treas. & Atty Gen., or any 3 of them				Examining Election Returns	Meets on Monday before last Wednesday of November after a general election to canvass election returns from counties for state and nat'l officers.
1 Printer	Elected by joint session of legislature.		Fees	\$30,000	State printing	Prints laws, legislative journals, court decisions and all other public printing.
1 State Accountant	Appointed by the Governor	4 years	\$1,500	\$10,000	Has charge of State accounts	Examines records and accounts of all public institutions and state departments; and accounts of county clerks and treasurers with reference to all transactions between the state and counties.
1 Oil Inspector	"	2 years	Not exceeding \$1,200 and expenses	\$10,000	Inspects oils	Tests all petroleum oils offered for sale in the state to determine their purity and safety.
5 Members Board of Pharmacy	"	3 years	\$3 a day+expenses. Sec'y \$600		Supervision of practice of Pharmacy	Examines, registers and issues licenses to all pharmacists.
4 Members Board of Dental Examiners	"	4 years	\$5 a day and expenses from fees		Supervision of practice of Dentistry	Examines, issues certificates to, and keeps a record of all dentists in state.
Notaries Public	"	"	Fees	\$1,000		Administer oaths, take acknowledgments, protest promissory notes, take depositions of witnesses, &c.
1 Fish Commissioner	"	2 years	\$3 a day		Fish culture	1. Enforces fish laws. 2. Examines waters of state with view to protection and propagation of fish.
1 Commissioner of Forestry and Irrigation	Appointed by the Governor and Senate	4 years	\$900	\$5,000	Promotion of Forestry	1. Holds public forestry meetings and disseminates information otherwise. 2. Conducts experimental stations.
1 State Agent	"	2 years	5 to 10 per cent of claims he wins	\$20,000	State prosecutor against United States	Prosecutes disputed claims of state against U. S.
1 Bank Commissioner (Mem Charter Brd*)	"	4 years	\$2,500	\$20,000	Bank Supervisor	1. Supervises banks and executes banking laws. 2. Upon examination of capital stock issues certificate to bank authorizing it to do business. 3. Assumes charge of insolvent banks.
State Military Board Maj. Gen., Adj. Gen. and 4 Brigadiers	"	2 years	\$3 a day while in session +5c mileage each way		Military auditing and advice	1. To advise Gov. on all military interests of the state. 2. To audit all claims and accounts of a military nature against the state. 3. To make rules (subject to Governor's approval) for organization, etc., of militia.
1 Adjutant General	"	2 years	\$1,500		Military	Has charge of organization, equipment and drill of militia.
1 Labor Commissioner*	"	2 years	\$1,000		Labor Statistician	Gathers and publishes statistics of labor, hours, pay, sanitary conditions, etc.
1 Superintendent of Insurance*	"	4 years	\$2,000	\$20,000	Supervises Insurance Companies	Examines condition of insurance companies; if default is found, reports to attorney general. Issues and revokes authority to foreign companies.
5 Members State Board of Charities.	"	3 years	\$3 a day and mileage		Control of state charitable institutions.	1. Appoints officers and employees. 2. Full power to adopt and enforce necessary rules. 3. Buys supplies.
9 Members Board of Health (physicians)	"	3 years	Expenses, salary usually fixed for Secy	\$5,000 whole board	Supervision of Public Health	Inspects public buildings, investigates causes of contagious diseases and epidemics, publishes statistics and advises concerning public buildings.
3 Members Live Stock Commission	"	3 years	\$5 a day while employed	\$2,000 each	Supervision of health of Live Stock	1. Orders quarantine or other regulations to protect stock from diseases. 2. May call surgeon of Agricultural College to prevent spread of disease. 3. May kill diseased animals.
3 Members Board of Pardons	"	At will of Governor	\$5 a day when employed		Recommends pardons	Considers pardoning of convicts or commuting sentences, and recommends conclusions to Governor.
3 Members Board of Public Works	"	4 years	\$1,000+mileage	\$20,000 each	Care of State buildings and land	Adopts plans for public buildings, condemns lands for same, lets contracts and superintends their construction.
1 Mine Inspector*	Appointed by Governor with consent of Exec. Council.	2 years	\$2,000	\$3,000	Care of Mines	Examines mines in state and may institute proceedings against owners for violation of the law.
1 State Librarian	Appointed by Governor upon recommendation of Supreme Court Justices (directors of library)	4 years	\$1,600 for self and \$1,200 for clerk hire		Librarian	1. Charge of state library at capitol. 2. Exchanges books and documents with other states and countries. 3. Makes report to Governor.
3 Members Metropolitan Police Board (in any 1st class city or class	Appointed by Governor and Senate (not more than two from same political party) The appointment of such a board	2 years or at Governor's will	\$300-\$400. Sec'y sum in addition not to exceed \$200		Control of Police force	1. Control of police force and property of police department. 2. Audit all claims against department. 3. Appointment of police judge, marshal, policemen.

1 Secretary Board of Health	Appointed by State Board of Health	At will of Board	Allowed by Board with approval of Governor	\$5,000	Executive of State Board of Health	1. Keeps records of board and has custody of all its books and papers. 2. Communicates with other state boards of health and attends to all correspondence.
11 Members Board of Agriculture	9 Appointed by State Agricultural Society + Gov. and Sec. of State who are ex-officio members.	Pres., Vice Pres., Treas. 1 yr. and members 2 yr	Expenses		Statistical	Edits census, compiles statistics of various industries of the state, disseminates information as to industrial interests; places statements concerning defective persons before superintendents of institutions.
1 Secretary of Board of Agriculture	Appointed by State Board of Agriculture	2 years	Legislature usually appropriates \$2,000			Fulfills bulk of duties of board of agriculture.
1 Secretary of Historical Society	Appointed by State Historical Society		Legislature usually appropriates \$1,200			1. Performs work of historical research with reference to Kansas for the board. 2. Custody of property of the board.
7 Members State Board of Education	3 appointed by Governor and Senate, + St. Supt., Pres. St. Normal, Chancellor St. Univ., Pres. Agr. College	2 years	Expenses		Issues certificates to teach in State	1. Upon examination issues diplomas and certificates to teachers in state, and may cancel same. 2. Examines the curriculum of a school and gives its graduates credit for its standard of scholarship. 3. Prepares questions for county examinations.
8 Members Text-Book Comss'n + St. Supt.	Appointed by Gov. with consent of Senate.	4 years	Traveling expenses and \$5 for each day's ses'n		Selection of school books.	1. To adopt text books for common branches in public schools. 2. To make 5 year contracts for furnishing such books.
3 Members State Board School Fund Commissioners	Composed of State Supt. Public Inst., Sec'y of State, Attorney General	2 years	Such pay as may be fixed by law		Investment of School Funds	1. Invests the permanent school fund, the State Normal, University and Agricultural College funds in public securities. 2. Keeps record of all bond dealings.
3 Members Bd Rd Com.* (See note below table on Crt. of Visita'n.)	Appointed by Executive Council (not more than 2 from each party)	3 years	\$3,000 (but legislature hasn't appropriated that sum regularly)	\$10,000	Supervision of common carriers	1. Investigates violations of law by railroads, express and sleeping car companies and other common carriers. 2. Inspects their books and documents, and gives them notice when improvements are necessary.
1 Architect	Appointed by Board Public Works	Not stated, but 4 yrs life of Board	Not to exceed \$2,500 + mileage	\$15,000	Architect for State Buildings	Draws plans and specifications required by the board and inspects construction and material of all public works.
40 State Senators	40 districts, 1 elected from each by its voters	4 years	\$3 a day (not exceeding 50 days for a reg. session or 30 days for spec. sess'n) & mileage		Legislative	1. Make laws and appropriations. 2. Elect U. S. Senators and State Printer. 3. Senate confirms certain nominations by Governor.
125 Representatives (in legislature.)	125 districts, 1 elected from each by its voters	2 years			Legislative	
3 Justices Supreme Court	Elected by voters of State	6 years	\$3,000		Judicial	1. Jurisdiction throughout the state. 2. Recommend the state librarian. 3. Appoint clerk and reporter of supreme court.
1 Supreme Court Reporter	Appointed by Justices of Supreme Court	2 years	\$2,000		Reporting	Compiles for publication the decisions of the court.
1 Clerk of Supreme Court	Appointed by Justices of Supreme Court	2 years	\$2,000	\$10,000	Clerical	1. Records orders, decrees and judgments of court. 2. Issues process.
29 District Judges. New districts may be made	One judge elected by the voters in each judicial district in the state	4 years	\$2,500		Judicial	1. Jurisdiction over respective districts in judicial affairs. 2. Appoint Co. Auditor in counties having over 45,000 population.
1 District Court Clerk in each county	Elected by voters in each Co.	2 years	Fees	\$2,000—\$60,000	Judicial	1. Custody of court records and papers. 2. Administers oaths and takes acknowledgements. 3. Keeps journal of court proceedings.
6 Judges Court of Appeals	State divided into 6 divisions one judge elected in each	4 years	\$2,500		Judicial	Created by legislature to relieve supreme court and ceases to exist 2d Monday in January, 1901.
6 Clerks of Court of Appeals	1 appointed in each division by judge of court	At will of Judge	Fees up to \$1,200	\$10,000	Clerical	Charge of all records and papers of court.
School District Meeting	Popular assembly of male and female voters, each district to contain at least 15 persons of school age				Charge of Educational interests of district	1. Elects director, clerk or treasurer annually. 2. Votes an annual school tax and how to distribute it. 3. Votes on school site, school term, sort of teachers, &c. 4. Directs sale of district property. 5. Directs suit in which district is a party.
District Board (director, clerk and treasurer)	1 elected annually by school district	3 years	No pay	Treasurer to give bonds for double funds handled	Executive of school district	1. Custody of district property. 2. Hires and pays teachers, and must visit each school at least once a year. 3. May suspend pupils. 4. Levies annual tax. 5. Decides matters left undecided by district meeting.
1 Township Trustee	Elected by Township voters	1 year	\$2 a day + \$3 a day as assessor	\$500 as assessor	Gen. Supt. Twp. affairs	1. Determines number and boundaries of road districts. 2. Care and management of property of township. 3. Appoints election judges and clerks. 4. Oversees the poor. 5. Is township assessor. 6. Levies tax for township with Co. Commissioners. 7. Furnishes Co. Clerk names for juries in dist. court.
1 Township Clerk	"	"	\$2 a day	Not less than \$300	Clerical	Custody of records and books of township.
1 Township Treasurer	"	"	\$2 a day	Twice amt. han'd		Receives and pays out Twp. monies on order of trustee.
3 Members Township Board	Trustee, Clerk, Treasurer	"			Auditing Board & highway commission	1. General supervision of highways and bridges. 2. Audits accounts of township officers.
Road Overseers	1 elected from each road district by its voters	"	\$1.50 a day	Twice amount of money handled	Care of roads	1. Must inspect and order bridges to be kept in repair. 2. Prevent spread of prairie fires. 3. Supervision of opening and repairing dist. roads.
Township Constables	2 or more elected by voters of each township	"	Fees	\$1,000—\$5,000	Enforcement of law	1. Ministerial officers in justices' courts. 2. Serve process issued by justices. 3. General police power, with jurisdiction over whole county. 4. May call on citizens of the county to enforce the law.
Justices of the Peace	2 or more elected by voters of each township	2 years	Fees	Sufficient to cover liabilities	Judicial	1. Jurisdiction of small offenses and civil suits. 2. May perform marriage ceremonies. 3. May take acknowledgments of deeds, &c.
3 County Commissioners	3 districts in a county and 1 Commissioner elected from each district annually	3 years	\$3 a day with time limits from 24 to 100 days.	Not less than 1-5 of 1% of taxable property nor to exceed \$5,000	General Agents for County	1. Charge of all county property. 2. Settle accounts of county. 3. Apportion and order tax levies. 4. Organize and name townships and arrange for their first election. 5. Erection and repair of county buildings. 6. Grant licenses for ferries and bridges. 7. Grant street railway franchises on county roads. 8. Lay out, alter or discontinue roads running through one or more townships and can alter route of a state road in county. 9. May establish election precincts in townships. 10. Constitute canvassing board for Co. and Twp. officers. 11. Fill vacancies in most Co. and Twp. offices. 12. Co. Health Bnd.—elect Co. health officer.
1 County Treasurer	Elected by county voters	2 years				

				\$700—\$2,500	Not less than twice the amount of money handled or at option of Brd of Co. Com.	Treasurer	1. Receives and disburses all monies of the county. 2. Collects taxes due the county. 3. Keeps Co. accounts under inspection of Co. Commissioners.
1 Sheriff	"	"	"	Fees	\$2,000—\$20,000		1. Serves and executes writs and process of courts. 2. Charge of county jail and prisoners. 3. Preserves peace. 4. Summons jurors and attends to drawings thereof. 5. Gives public notice of all elections.
1 Register of Deeds	"	"	"	Fees	\$2,000	Records titles	Keeps records affecting land titles & chattel mortgages.
1 County Attorney	"	"	"	\$400—\$1,800	Not less than \$1,000	Legal	1. Prosecutes or defends where county or state is a party. 2. Legal advisor of county officers. 3. Inspects jail and its management.
1 County Clerk	"	"	"	\$700—\$2,400	Not less than \$2,000	Clerical	1. Sec'y board of county commissioners, keeps their accounts, records, papers and seal. 2. Signs orders of board for payment of money. 3. Assesses property omitted by assessor.
1 County Supt. Public Instruction Chairman Co. Brd of Examiners.	"	"	"	\$3 a day for not over 150 days in small counties up to \$1,000 a year in populous counties	\$1,000	Supervision of educational interests	1. Forms school districts, visits schools, holds educational meetings, examines records of district officers. 2. Holds examinations, issues certificates, keeps record of teachers and candidates. 3. Apportions school money.
1 County Coroner	"	"	"	\$3 a day + mileage	\$500—\$5,000	Inquests	1. Holds inquests of the dead when cause of death is suspicious or unknown. 2. May summon witnesses where crime is suspected. 3. May issue warrants and cause arrests. 4. When there is no sheriff, or he is in jail, or is a party to the suit, the coroner performs duties of sheriff.
1 County Surveyor	"	"	"	\$4 a day	\$2,000	Surveying	1. Subdivides sections established by U. S. surveyor. 2. Surveys public roads and makes specifications for public works.
1 County Auditor (in Counties having over 45,000 pop)	Appointed by District Court	"	"	\$1,000	\$50,000	Auditing	1. Examines all claims against county, reports to Co. commissioners, and issues a monthly statement of claims allowed. 2. Examines books of Co. treasurer, clerks of district court and sheriff.
1 Probate Judge	Elected by county voters	"	"	\$1,000	\$2,000—\$25,000	Judicial	1. Examines funds of Co. Treas. with 2 other persons appointed by Co. Commissioners. 2. Jurisdiction over administrators and executors, intestate estates, minors, the insane, wills and habeas corpus. 3. Issues marriage licenses & druggists liquor permits. 4. Forms court to decide county election contests.

THE PART KANSAS HAS IN ELECTING NAT'L OFFICERS.

Representatives in Congress (8 at present)	1 elected by voters of each Congressional district.	2 years	\$5,000 (+mileage) paid by Nat'l Govt.	National Legislation.	To represent his district, his state, his country, and his conscience in the Nat'l House.
2 U. S. Senators.	Elected by Legislature in joint assembly.	6 years	" "	National Legislation and Foreign Treaties.	To represent his state, the nation, and humanity, on the floor of the senate.
Presidential Electors (10 at present)	Elected by voters of the state at large.		\$3 a day (+mileage) paid by the State.	To ballot for President.	Practically bound to vote for the candidate desired by the citizens who elected them.

Representatives are apportioned to the states by Congress according to population. Each state has as many Presidential electors as it has U. S. Representatives and Senators. The Speaker of the Nat'l House and the Pres. *pro tem* of the Senate each receive \$8,000 a year. Mileage for Reps. and Senators is 20 cents a mile; for Pres. electors and members of the Legislature in Kansas, 15 cents a mile.

*At the special session (Dec. 21, '98, to Jan. 9, '99) bills were passed, which, if said session is sustained in the courts, will change the above in several respects. (1) A State Society of Labor is provided for with power to elect a secretary who shall be *ex-officio* State Factory Inspector and Commissioner of Labor. (2) The State Superintendent of Insurance is to be elected in November, 1900, and every 2 years thereafter. (3) A State Association of Miners is provided for with power to elect a secretary who shall be State Mine Inspector. (4) The Metropolitan Police Laws are repealed, but cities over 40,000 are to elect a Board of 3 Fire and Police Commissioners to control the fire and police departments, appoint marshal, policemen, fire marshal, &c. (5) All acts and parts of acts relating to R. R. Commissioners are repealed and a Court of Visitation established to regulate freight rates, depots, crossings, service, secure safety of employees, &c. The Court is to consist of 3 judges elected by the state for 4 year term at \$2,500 salary. A State Solicitor is also to be elected same term and salary. Said Judge and Solicitor to be appointed by the Governor until elections of November, 1900. (6) A Charter Board is created (consisting of the Atty. Gen'l, Sec. St., and St. Bank Commissioner) to receive applications for permission to organize a private corporation or to engage in business in the state as a foreign corporation, investigate such applications, and grant or withhold said permission according to the facts of the case. (As we go to press we learn that the Supreme Court by unanimous decision has sustained the Special Session as constitutional and valid.)

†So much pay per day means so much for each day's actual employment in the business pertaining to the office.

There is a "Court of Common Pleas" in Wyandotte county and two "City Courts" in Kansas City, the latter having the jurisdiction of ordinary justices of the peace.

The singular verb is used for emphasis in speaking of the duties of Representatives and Senators, and in dealing with Boards the singular is used because it is the *Board* that acts.

The city council constitutes the board of canvassers for the city elections.

None of the canvassing boards can go behind the returns. They merely see that the returns are in proper form, the vote correctly added up, etc.

Contested elections are determined—

For state officers, district judges or members of the senate, by the state senate;

For members of the house, by the house;

For county officers, by a court consisting of the probate judge and two disinterested persons selected by him;

For township officers, by the county board of canvassers;

For city officers, by the mayor and council—

(at least in 1st class cities—no provision has been found for contests in 2d and 3d class cities, but the mayor and council as the city board of canvassers, and by analogy with 1st class cities, would seem to be the natural arbiters);

Bond, property-transfer, and county-seat elections are tested by the district court;

For presidential electors, by the state board of canvassers;

For U. S. Representatives by the Natl. House;

For U. S. Senators, by the Natl. Senate.

Certificates of elections are issued—

To state officers, national representatives, and presidential electors, by the secretary of state under seal of his office;

To county and township officers, by the county clerk (who acts as clerk of the county board of canvassers);

To city officers, by the city clerk under the seal of the city, and signed also by the mayor.

Kansas II.

The second analysis in the Kansas series is a tabulation of state, county, township and district officers, including judges and members of the legislative bodies. The mode of selection, term, bond, remuneration, general nature of business, and specific functions are shown for each office and board. The table is a valuable one but is too wide for THE INDUSTRIALIST page.

LOCAL NOTES.

Over seven hundred students enrolled since January 1.

The next meeting of the Riley County Teachers' Association will be held at Randolph, March 4.

Supt. Geo. D. Knipe of the Manhattan schools has been granted an institute conductor's certificate.

E. C. Thayer, '91, visited College on February 4, and addressed his old society—the Alpha Beta.

Prof. A. Emch spoke before the Engineering Club, February 16, on the perspectivograph and other link motions.

W. J. Yeoman, '93, was a visitor at College, January 31. He is engaged in mercantile trade at Mankato, Kansas.

A number of students in architectural drawing are making studies for the various building improvements intended to be made on the college campus next summer.

J. O. Tulloss has been elected manager of baseball interests for the season of '99, and Mr. G. F. Wagner has been made general manager of the athletic association.

Frank A. Waugh, '91, writes from Cornell University, Ithaca, N. Y., that he is working hard for his Ph. D. degree and that he may possibly get it by next commencement.

The apprentices are greatly pleased over their machine sketching which they have lately been doing under the direction of Professor Walters. They draw one hour per day.

La grippe has been abroad in the land this winter. Half of the students and nearly every member of the faculty have given more or less formal receptions to the hypothetical phantom.

The midterm examinations were held on February 11, and developed the usual state of things—high grades, low grades, failures, disappointments, heart burnings, and good resolutions. A few of the worst cases of failure were treated with the pruninghook.

Mr. J. F. Crawford, of Elbing, Kan., writes to the Veterinary department of this College: "On the day before I received the vaccine four calves died; since using it I haven't seen a sign of the disease." Mr. Crawford vaccinated sixty calves under the direction of Dr. Fischer of this College.

The College Bookstore has done lots of business during the month of January. The cash sales amounted to \$1282.00, and the exchange of second-hand books to \$4.65. Adding to these items the amount of the department transfers gives the sum total of \$1372.65. The payroll expenses for the month were only \$7.00.

The Horticultural department has prepared a printed price list of the vines, fruit trees, shade trees, and ornamental shrubs that can be disposed of in the spring. It will be mailed to any one in the state upon request.

The singing at the morning chapel exercises has greatly improved since the new hymn books have been distributed. The "College Lyric" was compiled by a faculty committee and printed by the Printing department.

Gilbert J. Van Zile, '90, who in '93 married Mary Pierce, then a junior, died, last Saturday, at his home in Illinois, leaving a wife and two sons to mourn his departure. Mr. Van Zile was a lawyer by profession.—*Students' Herald*.

On February 16, Miss Harper addressed the Farmers' Club of the College on "Dairying in Sweden and Norway." She spoke chiefly from her own experience and observations. The address was highly entertaining and instructive.

The third number in the society lecture course was filled on Saturday, Feb. 4, in the college chapel by the Schubert Concert Company. The music and singing were first class, and the reading the best given here this year. The next number will probably be a lecture by Frank Bristol of Chicago, some time in March.

Senator Taylor in his address at the dedication of the Domestic Science Hall said that the State of Kansas is rich enough to provide sufficient room for its higher institutions of learning. He thought it was simply a question of making the legislature see the absolute necessity of additional buildings and equipments and they would be granted.

MARRIED.—Wednesday, February 15, at the home of the bride, Leavenworth, Kan., Mr. Emmett Vivian Hoffman and Miss Beulah Brown. Mr. Hoffman is the son of Regent Hoffman, and a graduate of '98 of this College, and Miss Brown was a second year student here last term. THE INDUSTRIALIST wishes the young couple a happy journey thru life.

E. C. Butterfield, '98, writes from Millbrook, N. Y., that he will soon have charge of a large greenhouse that is being erected for the purpose of forcing fruits. He casually mentions a handsome increase in salary, which, as we all know, is one of the finest things that can happen. The horticulturists of the K. S. A. C. are coming to the front.—*Students' Herald*.

This state needs a high-grade dairy school. Kansas is badly behind her sister states in this respect. The dairymen and creamerymen want it; the patrons want it; the students want it; and we believe the state should grant it immediately. It is estimated that the work of the Minnesota dairy school has increased the price of all Minnesota butter one to two cents per pound. The Kansas dairy school can do as well for Kansas. The sum asked for on this account is \$40,000.

A letter was received February 15 from Mr. P. F. Fleming, late a student of this College. The letter came from Manila, and requested to have certain bulletins sent from the Experiment Station to Mr. Fleming. He remarks that crops are good in that region. They consist largely of wild bananas, cocoanuts, oranges, and monkeys. The natives do about as large a business in selling monkeys to the soldiers as in selling fruit.

The students' pay-roll for January was \$860.05. This sum, averaging about one dollar and twenty cents per student, represents 8600½ hours of honest, voluntary labor in the barn, the shops, the green-houses, the dining hall, the printing office, the janitor's service, etc. The pay-roll of the department assistants and foremen amounted to \$350.58—a well earned sum, especially in the month of January with the thermometer hovering near zero.

Under the heading, "One of Our Practical Colleges," the *Western Creamery* contrasts this College with that of its own state in the following words: "The conduct of the Kansas State Agricultural College is worthy of imitation by the California institution at Berkeley. Our beautiful state is away off here by itself, as it were, and the conduct of the California State College of Agriculture is inexpressibly behind the times. Fossilized ideas, originating in the 'old country' still hold sway."

The report of the Kansas commissioners of the Omaha Trans-Mississippi exhibition speaks of the exhibit of the Horticultural department of this College in the following handsome words: "The great grape exhibit was made by the Kansas State Agricultural College. No state or locality presented so many varieties of grapes in such splendid and satisfactory condition. The extent and variety of this exhibit secured many complimentary remarks from visitors and words of praise for the College."

EXPERIMENTING WITH HOG CHOLERA.—The Jensen Creamery company have received twelve shoats, weighing an average of 140 pounds, from the Kansas State Agricultural College. These hogs, under the supervision of the state veterinarian, Paul Fischer, have been inoculated with hog cholera serum, and form a link in the experiments conducted by the agricultural department. These hogs will be subject to the most trying exposures while here, and Mr. Jensen is now looking for a dead hog, that positively died from cholera or the swine plague, that it may be left in the pen with these pigs.—*Beloit Gazette*.

The Minneapolis, Minn., *Farm, Stock, and Home* speaks thus of Bulletin No. 81 of our Experiment Station: "It is a popular treatise on the dairy cow and her treatment, and reflects great credit upon the station and the state. It is exhaustive and intensely practical, showing that the persons in charge of that department thoroly understand the work in their charge, and appreciate the needs of Kansas farmers. There is no subject that is of so great importance to Kansas just at this time as the proper care of the dairy cow. Kansas is making rapid growth in the line of dairying, and in order

to have this growth continue permanently it must be profitable, and if the farmers will read this bulletin and follow its teachings their success in dairying will be assured, and in the near future the state will be found well to the front in this great industry. This bulletin alone is worth more than all the station has cost for a period of five years, and should be read and its teachings followed by every dairyman in the state."

While the College asks the legislature this winter to provide more adequate quarters for the Farm department, the department of Physical Science and the shop work, it should not be overlooked that nearly every other department is greatly in need of more room. The Music department, for example, taught last fall term 276 pupils in vocal music, 20 young men in the B band, 28 young men in the A band, 23 pupils in the orchestra, 57 on the piano, 8 on the organ, 53 on the violin, 1 on the viola, 1 on the cello, 1 on the double bass, 13 on the mandolin, 24 on the guitar and 3 on the banjo—a total of 487. This term the department is even more crowded. Oh! for more room!

One of the very best of the nearly one hundred farmers' institutes which have been assisted or held this winter by faculty delegations from this College was that of Hiawatha. The program provided for a three-days' session and it was punctually carried out. The attendance was all that could be crowded into the large court room. In another room was a corn exhibition with 126 entries. The corn crop of northeastern Kansas was comparatively light last year, and the papers of the East were loud in proclaiming "another drouth in poor Kansas," yet, there were four entries showing single corn ears that weighed over one pound each. The heaviest corn ear weighed $17\frac{3}{4}$ ounces.

Second year student, Roland Mitchell, of Florence, was the victim of a serious accident some two or three weeks ago. He was running the large electric stone crusher. The iron jaw was not working just right, and thinking an unusually hard rock had been thrown into the hopper, he lay flat down on the platform to investigate the matter. The real cause of the trouble, however, was the slipping of a pulley which just then left the shaft and struck the platform where he was lying. Flying debris of some kind struck Mitchell in the right leg just below the knee. He was removed to Dr. Lyman's hospital where he received the best of care without cost to himself. He is about again, tho temporarily on crutches.

The records in the office of the adjutant general do not contain the name of John O. Morsebery who was in the list of wounded at Manila. The *Kansas City Journal* thinks that it has discovered his identity and has printed the following: The "John O. Morsebery," of company K, Twentieth Kansas volunteers, whose name appears in the list of wounded in Friday's battle, is thought to be John O. Morse, sergeant of that company, the last syllable of the name having been changed from "serg." written as an abbreviation for "sergeant." No such name as Morsebery appears on the roll of the

company kept in Topeka. John O. Morse, '91, K. S. A. C., enlisted from Mound City under the third call, and joined the regiment at San Francisco.

February 15 was properly "remembered" at the College. The flag was at half-mast; the volunteers of the Spanish War were present in full uniform; Professor Ward read "Lincoln's Address at Gettysburg" from the chapel platform, and President Will spoke in an appropriate and feeling way of the "Maine incident," the heroic war in Cuba, the present war in the Philippines, and the duties which thru the annexation of these Spanish territories have been laid on the shoulders of the American nation. Professor Brown asked the students to sing "America" and proposed three cheers to the noble defenders of American principles, and students and faculty made the walls of the chapel ring with patriotic shouts. May the "Maine" be remembered forever.

In its report of the Missouri Dairy Association, *Colman's Rural World*, of St. Louis, one of the oldest and best agricultural papers of the West, has the following to say of the address by Assistant D. H. Otis, of this College: "The papers and discourses were all practical. Theory was backed up every time by actual experience, and the facts and figures given. Take, for instance, the address of Prof. D. H. Otis, of the Kansas State Agricultural College, on the subject of "The Creamery Business from a Patron's Standpoint," no man who is the owner of even one cow could fail to be interested, and interested to his profit. Illustrated by charts and tables of figures, it gave the yield of milk and of butter from different herds of cows, and traced the difference in the product of those herds to the breed of the cattle, to the care of the animals and to the food given them. This address not only gave these facts, but showed plainly why they were facts. The deduction arrived at by Professor Otis that alfalfa is the very best food for dairy cattle is not a decidedly encouraging fact for Missouri dairymen. It appears to be conceded that alfalfa can not be grown successfully in Missouri, but clover, which ranks next to alfalfa, does no better anywhere than in Missouri, and it may be discovered in time that it is not impossible to raise alfalfa.

A LETTER FROM MANILA. —A letter, dated January 1, was received a few days ago from one of the Kansas soldiers who was in the late battle, namely, Robert M. Lee, second-year in 1895. He says that instead of pailfuls of water to the square foot, as expected, it has not rained hard since he has been in Manila. The deadly climate is not apparent; no discomfort is felt from heat. In the large room in which the Twentieth is quartered, the middle portion is kept open for a passage, gymnasium and dance hall. There are a violin and a banjo in the battalion, and the stag quadrilles are very spirited. It is more comfortable in barracks than in camp. The boys were to get two months' pay early in January, but Mr. Lee says he has been without money so long he has got used to it. It is almost impossible to borrow a nickle or a two-cent stamp. The captain franks soldiers' letters home. The writer of this letter looks back to San Francisco.

with almost the same feeling as home, having had such a pleasant time there. Tho a populous city, the main street of Manila is only a few blocks long, and lined with two-story buildings; but there are some large and fine churches. The Chinese are different from the Chinese in America; they show much more animation, and may often be seen laughing. There are three kinds of soldiers in Manila. The Filipinos come into the city often. The Spanish are quartered in a church; blankets are scattered over the floor; and card games are going on behind the pulpit. There are several American newspapers, two of them dailies. Mr. Lee sends a copy of the "American," which shows by its advertisements that the Americans are taking hold. For example, there was a grand American excursion to Corregidor Island.

KANSAS LEGISLATORS AT THE COLLEGE.

A party of senators and representatives arrived in the city, February 6, to visit the College that they might better understand the needs of the institution. They were met at the station by President Will and taken direct to the College and dined in Domestic Science hall. After lunch the party was shown thru the buildings and over the grounds and made acquainted with the workings of the various departments and needs of each. Those of the party who had never visited the institution before expressed great surprise at its magnitude, and those who were familiar with the College in years gone by were delighted with the wonderful advance made. Members of the party were: Senators—Forney and daughter, Field and daughter, Householder and daughter, Lupfer and son, and Helmick. Representative R. R. Rees, of Minneapolis, member of the class of '85, who was visiting his brother, Boyd Rees, accompanied the visiting party; as did also Representative Martin.

We are sorry that the party did not come on a regular College day.

CHEMICAL DEPARTMENT.

Notwithstanding the fact that quite a number of students dropped the study with the end of the fall term, over 125 are still getting instruction in elementary chemistry. This large number makes the use of recitation rooms in another building necessary for a part of the work. This term laboratory benches can be supplied with sufficient ease, since each student comes but once a week, but next term, when all will come daily, the problem of room for them will be the most difficult of solution that has ever presented itself to the department. The professors wish that all of the members of the legislature could feel the need as they do of a new building for the department. The need while thus imperative for the elementary work is still more pressing for the advanced work.

Professor Willard is just completing his bulletin giving an account of last year's results with sugar beets. The analyses show a considerable advantage to the growers in the northwestern part of the state. The same results have not been obtained in previous years, however, and while suggestive, and in line with what might be expected, further observations are required before we can be assured that this section has a distinct climatic advantage over other parts of the

state. Plans are being made for the work in this line for the next season. The department will not, unless under very exceptional conditions, furnish seed to isolated growers next year, but only to those who will form a club of six or more to test a given locality. The Department of Agriculture will supply us with seed again as last year. Farmers who are desirous of growing half an acre under specified conditions, keeping an accurate account of all expenses incident thereto, will also be furnished with seed as far as the supply will permit.

THE COLLEGE AND THE COMMONWEALTH INSTITUTE.

On February 5 to 11 occurred a notable meeting at Topeka; that, namely, of the Commonwealth Institute. The Commonwealth organization is composed of earnest men and women interested in the study of present day ethical, economic and social problems. The meetings were held, with few exceptions, in the state capitol. Among those who appeared on the program were Chancellor F. H. Snow, Hon. Edwin Taylor, Mr. John S. Hopkins, former Gov. John P. St. John, Chief Justice Frank Foster, Mrs. Cora Lewis, Senator H. W. Young, and Prof. George D. Herron. Professor Herron repeated a course of six lectures which he had recently given in Chicago. The impression created by his thought and personality was profound. State Supt. Frank Nelson and Mr. G. C. Clemens, supreme court reporter, were also advertised to address the institute.

The Agricultural College was well represented by faculty and regents. Professor Bemis spoke on, "Trusts—the Good and the Evil in Their Development;" pointing out that it is folly to think of destroying them; but that instead they should be made to serve the public good. Professor Parsons spoke on, "Municipal Ownership—Its Ethics and Progress;" his address attracting marked attention. Former-Regent George M. Munger discussed "Civil Service." Regent Carl Vrooman presented a paper on the progress of democracy among advanced nations during the nineteenth century. Regents St. John and Hoffman and President Will participated frequently in the general discussions.

Few influences can contribute more to the clearing of the social atmosphere, and the bringing together of those whose chief interest is the general welfare, than meetings of this character, in which students of vital issues representing various points of view meet and calmly compare ideas with the sole object of arriving at the truth. It is fitting that a college which stands preëminently for freedom of science and discussion should be in evidence at meetings of this character.

CONDENSED NOTES FROM A CROWDED DAIRY.

Forty-four industrial students (twenty-five specials, nineteen second years) present a scene of great activity at the College Dairy. The crowded condition made it imperative to convert a grain bin into a butter room, and a dressing room into a testing room. The boys are now obliged to use one corner of the basement as a dressing room, where their privileges are on a par with those of the cows.

Separating Room: 14 by 16 feet; used as an office; contains one

desk, four separators, three tables, two milk and cream coolers, one aëerator, one stove, one pair of scales, four Manns acid tests, two cases of glassware, and two rolls of wrapping paper, besides serving as a store house for dairy records and supplies. From four to eight students work in this room every day except Sunday.

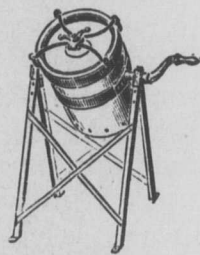
Butter Room: 14 by 16 feet. Here the students become acquainted with seven hand churns, seven butter bowls, four butter workers, two butter prints, and also have to make room for the two tables, one pair of scales, one stove, and a sink. From three to eight students work in the room every afternoon and all day on Mondays.

Testing Room: 11½ by 16 feet. With one window to the north, this room is furnished with five Babcock testers, four tables, two sinks, testing supplies, one heating stove and one gasoline stove. The latter is used for the reason that the water heater has not sufficient capacity to give all the hot water needed. Besides testing, this room is used by all boys who work on the farm as a wash room and a place to record their time.

General Room: 12½ by 16 feet. This room contains four cream vats, and is used to store milk, cream, butter, salt, milk cans, pails and dairy utensils of all kinds. It also contains one large hot water tank, and one large sink where most of the dairy dishes are washed.

When the dairy students are working on herd records they seek shelter in the office devoted to the field and feeding work of the farm.

The College Dairy is indebted to the following persons for loans and donations: De Laval Separator Company, Chicago, for the loan of two separators, the Baby No. 3 and the Alpha Hummingbird; Genesee Salt Company, N. Y., one barrel Genesee salt; Diamond Crystal Salt Company, St. Clair, Mich., one barrel diamond crystal salt; Frank Sturges, Chicago, one Sturges steel churn; Oaks & Burger, Catteraugus, N. Y., one 30-gallon Empire State and one 30-gallon Union Factory milk cans; Douglass Butter Culture Company, Boston, one bottle of butter culture every week; Chas. Hansen's Laboratory, Little Falls, N. Y., three bottles of Danish lactic ferment; India Alkali Works, Boston, one keg of Savogran.



STURGES CHURN.

Were it believed that it would be necessary for such conditions as are indicated above to continue, the management of the Agricultural College would not have the hardihood to invite students to attend the Dairy School of the State Agricultural College. It is only because of the pressing need for dairy instruction in Kansas, and the belief that when once the earnestness of the College in its demand for a Dairy School has been demonstrated the legislature will come to our relief with a suitable dairy equipment, that work is carried on under such conditions.

THE COLLEGE AND THE LEGISLATURE.

So great has been the growth of the College and such has been the increase in the needs of the institution, because of the increase in the numbers of students, the introduction of new courses, and the striking out on new lines, that it has seemed imperative to request

of the legislature, this year, considerably more than has been asked in the past.

After a very careful examination of the needs of the College, and a study of the legislative situation, it was decided to ask for approximately \$200,000 for the next two years. This may seem large in comparison with previous requests, but at the same time it is modest by the side of the request of the State University, which amounted to \$431,000. The university and normal school bills were introduced in the house, while the college bill was introduced in the senate. The house ways and means committee made some reductions; the senate committee, however, was disposed to be more severe, and voted to cut the college bill in half, allowing but \$100,000. one of the members asserting that we were fortunate in not having the amount cut to \$75,000. After an earnest plea, however, by the college representatives, and a resolute stand taken by the chairman of the ways and means committee, Senator Forney, the committee agreed to recommend an appropriation of \$125,000.

The following table shows briefly the present situation of the appropriation bills of the three state institutions, except that the university bill for the mechanical building has passed the house:

APPROPRIATIONS TO STATE EDUCATIONAL INSTITUTIONS.

STATE UNIVERSITY:	Applied For.	Allowed by Ways and Means Committee.
Current expenses, \$130,000 per year	\$260,000	\$240,000
Chemistry building	60,000	55,000
Natural history museum	75,000	75,000
Mechanical building	30,000	30,000
Fire protection	6,000	5,000
Totals	\$431,000	\$330,000
STATE NORMAL:		
Current expenses, \$35,000 per year	\$70,000	\$70,000
Boiler house	25,000	18,000
Summer school, \$5,000 per year	10,000	10,000
Vault	1,500	1,500
Janitor's residence	1,000	1,000
Total	\$107,500	\$90,500
STATE AGRICULTURAL COLLEGE:		
Agricultural and physical science building	\$75,000	\$25,000
Addition to mechanical building	9,000	9,000
Addition to library	12,800	8,400
Addition to chapel	20,000	20,000
Current expenses, \$10,000 per year	83,005	62,600
All other purposes		
Totals	\$199,805	\$125,000

BOOKS AND PERIODICALS.

The *Youth's Companion*, January 26, contained one of John Burroughs's instructive and entertaining articles entitled "The Cunning of Birds." He recalls many instances of the cleverness of birds in outwitting squirrels, snakes, weasles and other enemies, and at the same time tells a story or two showing that some birds can be as stupid as some folks.

Among the best and most practical features of the household magazines of the day, is one carried out by *Table Talk*, which, in giving menus for the month, adds directions for the economical carrying out of the same. The February issue has this attractive feature, as well as many recipes, given in reply to inquiries from housekeepers all over the country.

The series of articles which began in the January number of the *Irrigation Age*, entitled "The Irrigation Problems and Possibilities of Northern Wyoming," should be of especial interest. Elwood Mead, is the first contributor to the series, followed by Captain Chittenden, Colonel Nettleton and Mr. Johnston, who were members of the surveying party sent out by the United States government to locate reservoir sites in Wyoming.

Since the revival of *The Arena* under Mr. Tyner's direction, *The New Time* of Chicago, *The Temple* of Denver, and *The Journal of Practical Metaphysics* of Boston have been consolidated with it, more than doubling its circulation, and making *The Arena* in every way stronger and better than ever before. Delays incidental to consolidation and reorganization on a basis adequate to the largely increased edition called for, compelled the issue of a double number for November and December and delayed the January issue.

The February *Ladies' Home Journal* offers more than the expected variety of literary and pictorial features. It opens with an article by Mrs. Ballington Booth, taking the reader thru state prisons, pointing out the awfulness of prison life, and the hopelessness of a released prisoner's efforts to gain unaided a place where he can get a livelihood. The story touches the heart and will attract wide-spread interest. Mrs. Lew Wallace writes of "The Murder of the Modern Innocents," a powerful and convincing protest against the over-education of children.

The February *Delineator* presents a variety of illustrations and descriptions of present and prospective styles in every department of dress, a number of literary features that make the magazine one of the most readable of the month, together with discussions of great household interest. Mrs. Alice Meynell contributes another scholarly child-study in the series on the boy and his development. In the series on the cultivation of the voice by Eleanor Georgen attention is directed to the full values of the consonants. The papers on amateur photography, by Sharlot M. Hall, are concluded in this number by another article on essential formulas.

The midwinter *Frank Leslie's Popular Monthly* is bright, crisp and picturesque. It is to some extent a Spanish-American number, embracing among its leading illustrated articles: "West-Indiaward, Ho!" in which Champion Bissell gives some valuable information and advice to citizens of the United States who contemplate settling in Cuba or Porto Rico; "An Old Spanish-American Colony," by F. Williamson, giving a beautifully illustrated account of a journey up the great Magdalena river of South America, and a ride over the Andes to the Columbian capital, Bogota; and "General Gomez's Tactics, and Cuban Law and Order," by Thomas R. Dawley, Jr., the famous war correspondent.

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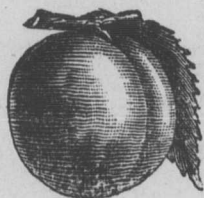


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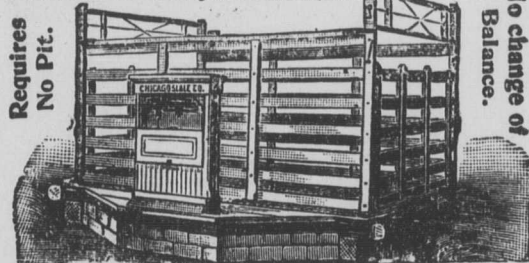
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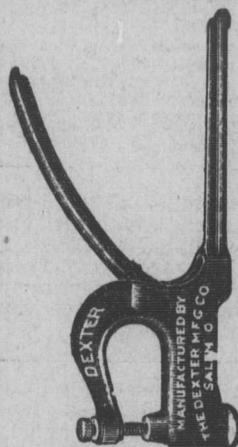
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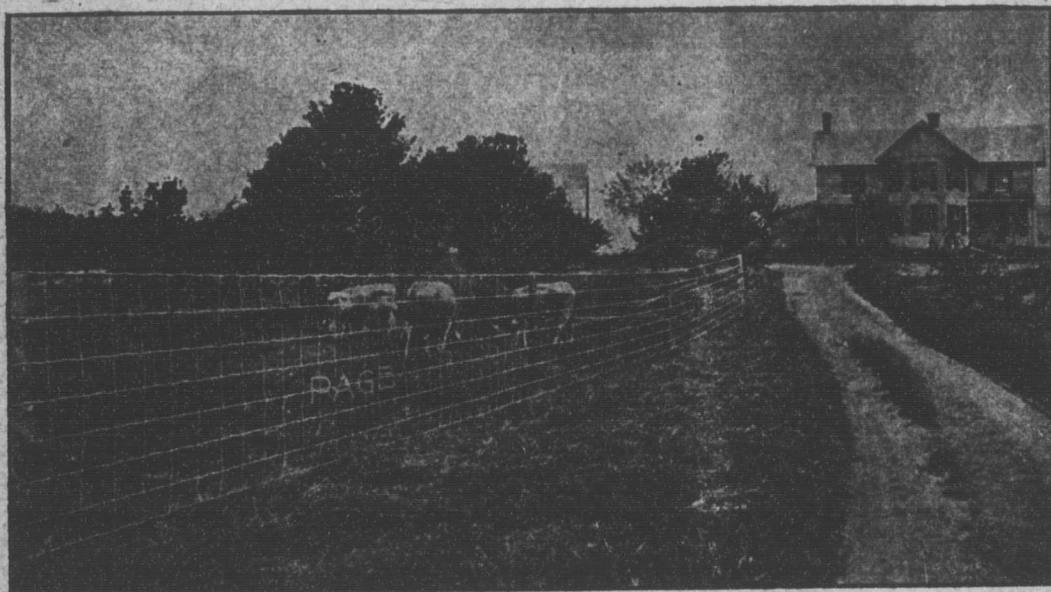
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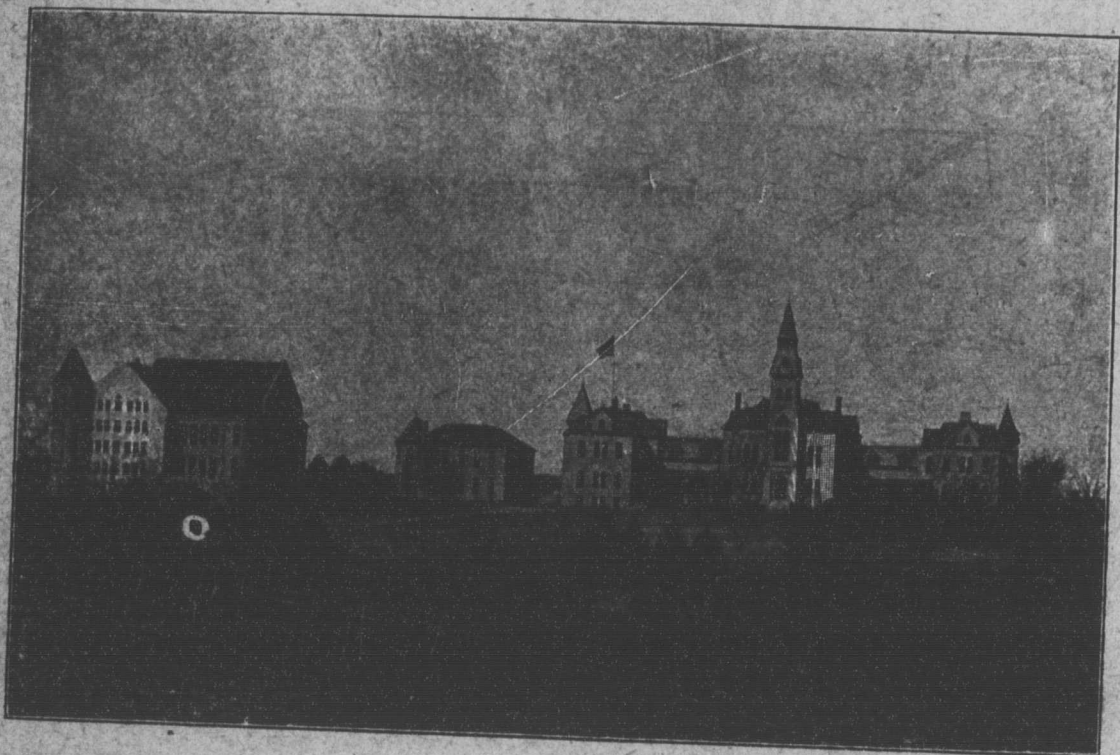
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